CWSRF STORMWATER PROJECT PLAN FOR THE AUGUSTA DRAIN DRAINAGE DISTRICT IMPROVEMENTS

FOR OAKLAND COUNTY WATER RESOURCES COMMISSIONER

WRC
WATER RESOURCES COMMISSIONER

April 7, 2023
HRC Job No. 20220896

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Versions:
Draft: April 7, 2023

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SECTION 1.0 — SUMMARY AND RECOMMENDATION

1.1 SUMMARY

The Project Plan for the Augusta Drain Drainage District Improvements Project has been prepared using the Project Plan Preparation Guidance of the Clean Water State Revolving Fund (CWSRF) Administrative Rules. While the rates have not been set yet for FY2024, the rates in FY2023 were 1.875% and 2.125% for 20-year loans and 30-year loans, respectively. These rules call for compliance with the basic Federal Planning Requirements and the National Environmental Policy Act (NEPA). This Project Plan must be submitted to the Michigan Department of Environment, Great Lakes, & Energy (EGLE) by May 1, 2023, in order to be on the project priority list for the fiscal year of 2024.

The Oakland County Water Resources Commissioner's Office (OCWRC) submitted an Intent to Apply for a Stormwater Project Plan for SRF funding on October 28, 2022. This Project Plan is intended to identify projects within Augusta Drain Drainage District, obtain funding, and work toward meeting the goals and objectives identified in the Asset Management Plan developed for Augusta Drainage District in 2019.

OCWRC has decided to take action to improve stormwater network and water quality within the Augusta Drain Drainage District. The proposed projects listed herein as part of this CWSRF Project Plan are to address National Association of Sewer Services Companies (NASSCO) Pipeline Assessment Certification Program (PACP) structurally rated 4 and 5 pipes and structures in the storm system. A list of these pipes segment and structures can be found in Appendix F. Additionally, this Project Plan will help reduce stormwater pollutants and manage flow in Augusta Drain by rehabilitating storm pipes, pipe structures, and fall drop structures.

Focusing on the pollutant removal within the drainage district will help the County archive EGLE's enforced Total Maximum Daily Load (TMDL) for phosphorous, Escherichia coli (E. coli), dissolved oxygen (D.O.) and biota.

The Oakland County Water Resources Commissioner (WRC) welcomes any funding available to assist with the Augusta Drainage District to rehabilitate this aged system at a minimal cost to a community with limited financial resources.

1.2 CONCLUSIONS

The following is a summary of the proposed projects:

- Alternative 1C – Rehabilitation of the Augusta Drain Drainage District Drop Fall Structure located 250 ft Northwest of 404 Lake Laura Dr, Pontiac MI and rehabilitation of the Junction Chamber, located adjacent to the Drop Fall Structure.
- Alternative 2C – Pipe rehabilitation including spot lining and grouting of storm pipes and rehabilitation of existing storm manholes.
- Alternative 3B – Riparian buffer strip installation within North Kiwanis Park, also known locally as Stanley Park, to improve water quality by addressing non-point source pollution.

1.3 RECOMMENDATIONS

The selected projects identified in this Plan have been reviewed and found to be the most cost-effective and environmentally-sound alternatives. The following recommendations are therefore to be made:

- A resolution should be formally adopted approving acceptance and implementation of this Plan.
- The WRC should apply for a low-interest loan under the CWSRF program and apply for disadvantaged grant funding and/or principal forgiveness.

SECTION 2.0 — BACKGROUND

2.1 STUDY AND SERVICE AREAS:

The Augusta Drain is the established County Drain under Chapter 20 Drain Code, Act 40 of 1956. The Drain Code Act 40 of 1956 gives the Oakland County Water Resources Commissioner powers and responsibilities to maintain and govern legally established drainage systems within the County. The Augusta Drain is in Clinton River watershed and located entirely in the City of Pontiac, Oakland County, Michigan. The Augusta Drainage District consists of approximately 4.89 square miles, which encompasses 24.1% of the City of Pontiac. The Augusta Drainage District is shown in Figure 2-1, included at the end of this section.

The Drain was designed and constructed between 1969 and 1970 and includes several separate segments to fulfill various purposes within the District. The primary goal of the Augusta Drain system is to control the overflow from Lakes Osmun, Terry, and Harris, to direct stormwater from northern downtown Pontiac, as well as to connect Pontiac storm sewers to the Pontiac Clinton River No. 1 Drain. The main segment of the Augusta Drain begins at Osmun Lake and flows generally to the southeast. This segment of the Drain merges into the Pontiac Clinton River Drain No. 1 in the city of Pontiac and ultimately flows into the Clinton River. Descriptions of the system segments can be found below:

2.1.1 Augusta Drain Drainage District System

Enclosed Storm Sewer System

The Augusta Drain system includes the enclosed storm sewer system and open drains. The components within the enclosed storm sewer system encompass pipes, storm sewer manholes, inlets, and catch basins that collect stormwater from the drainage district and direct the flow to the outfalls. The open drain section includes culverts, open channels, check dams, and outfalls.

Open Channel

The Augusta Drain has several open channel segments that are located near Lake Osmun and the Norton channel. These segments are connected by a 12’ reinforced concrete pipe. Overflow from Lake Osmun spills over a dam and into a 12’ wide open channel that flows south towards Cesar Chavez Avenue. The Lake Osmun open channel connects into a 12’ reinforced concrete pipe located in as single box conduit that runs southeast, crossing underneath Oakland Avenue and Cass Avenue. The 12’ pipe transitions to a 10.5’ diameter pipe underneath the railroad tracks located just before the entrance of the Norton open channel on the west side of the railroad tracks.

The Norton open channel is 24’ wide and receives water from the concrete pipe that collects overflow from Lake Osmun, as well as the tributary along the west side of the Grand Trunk railroad tracks that begin near the County courthouse. The Norton channel starts near North Johnson Street and flows along Norton Street towards the Norton inlet. There are three utility crossings in the form of bridges located at North Johnson, Florence, and Sanderson Streets. At the Norton inlet, flow is separated into two parallel 10.5’ concrete pipes that flow under the northern half of downtown Pontiac and exits into the Clinton River.

The section of the Augusta Drain that runs beneath downtown Pontiac starts by crossing underneath Cass Avenue going northeast and then curves to go southeast toward Lafayette Street. The curved segment that moves underneath downtown Pontiac is made of two parallel 10.5’ pipes that merge to

form a double box drain with two 10'x10' adjacent boxes. The Drain moves east and intersects with Mill Street until it begins to merge south and transitions into the Pontiac-Clinton River No. 1 Drain near East Huron Street and northbound Woodward Avenue. Each Drain segment contributes a double 10' x 10' box merge that then forms a triple box drain, with outer boxes that measure 10' x 10' and a central box that measures 10' x 20'. The Augusta Drain includes the double box structure, however only the northern-most box in the triple box structure is considered a part of Augusta. The center and southern boxes are elements of the Pontiac-Clinton River No. 1 Drain.

In addition, there are segments of the Augusta Drain that collect flow from the Pontiac storm sewer system to outlet through the Pontiac-Clinton River No. 1 Drain to the Clinton River. These segments are located along southbound Woodward at Huron Street, Lawrence Street, and Pike Street. The downtown area served by these branches is located west of Saginaw Street and north of Huron Street. These branches outlet to the Pontiac-Clinton River No. 1 Drain segment that runs along southbound Woodward at Orchard Lake.

2.1.2 Lakes, Rivers, Ponds, and Wetlands

The general locations of wetlands are shown in relation to the proposed project locations according to data from the National Wetlands Inventory and the U.S. Fish and Wildlife Service (USFWS). Figure 2-2 depicts natural wetland features within the drainage district. An official field review would need to be performed during design of the project to determine the presence or absence of any potentially regulated Part 303 of Public Act 451 of 1994, as amended wetlands.

2.1.3 Parks and Recreational Areas

See Figure 2-3 for the Augusta Drain District Parks and Recreation map for locations of recreation areas within the drainage district.

2.1.4 Land Use in Study Area

Current Use

The largest three land use types within the Augusta Drain Drainage District (excluding open space and utilities) are single–family residential (23.08%), commercial/ Office (7.77%), and Industrial (6.30%). The existing land use within the Augusta Drainage District is shown in Figure 2-4 and summarized as follows in Table 2-1: Drainage District Land Use Acreage 2020Table 2-1.

Predicted Land Use

The predicted future land use within the drainage district is expected to be consistent with the existing conditions since much of the drainage district is fully developed.

Table 2-1: Drainage District Land Use Acreage 2020

Land Cover Type	Acreage	Percent of Total Area
Single Family Residential	722.72	23.08%
Multiple Family	114.95	3.67%
Mobile Home Park	7.43	0.23%
Commercial/Office	243.39	7.77%
Industrial	197.22	6.30%
Public/Institutional	396.93	12.58%
Recreation/Open Space	157.22	5.02%
Road ROW	558.80	17.85%
TCU	154.48	4.93%
Vacant	494.43	15.90%
Water	43.26	1.38%
Railroad ROW	40.34	1.29%
Total	**3131.17**	**100%**

Data provided by SEMCOG land use data: https://semcog.org/community-profiles#Land

Surface and Groundwaters

Pollutants from the contributing areas significantly impact the Augusta Drain. The land cover is highly impervious in the City of Pontiac, allowing little opportunity for stormwater infiltration and natural pollutant removal. Currently, the Augusta Drain has established Total Maximum Daily Loads (TMDLs) requiring the community to achieve a reduction in Non-Point Source (NPS) pollutants to improve overall water, habitat, and biotic quality. The Augusta Drainage District has a TMDL for *E. coli.* See Appendix H for copies of the EGLE- established TMDLs.

National Pollutant Discharge Elimination System (NPDES) Permits

Entities discharging or proposing to discharge storm or wastewater into the surface waters of the State are required by law to obtain a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES permit is intended to control discharge into the surface waters of the State by imposing effluent limits and other conditions necessary to meet the State and Federal requirements. See Appendix I for a copy of the County's current NPDES permit.

2.2 POPULATION DATA

According to Southeast Michigan Council of Governments (SEMCOG), the 2020 United States Census estimated the population for the Augusta Drain Drainage District as 18,375, which is an increase of approximately 600 people since 2010. The U.S. 2020 Census Bureau data estimated the average household size in the County at 2.3 people per household. The population projections for Augusta Drain Drainage District, City of Pontiac, and Oakland County are shown below in Table 2-2:

Table 2-2. Population Projections

Year	Augusta Drain Drainage District	City of Pontiac Population	Oakland County Population
1940	19,872	66,626	254,068
2000	20,135	67,506	1,194,156
2010	17,751	59,515	1,202,362
2020	18,375	61,606	1,274,395
2030	18,100*	60,685*	1,286,750*
2040	*18,218**	*61,079**	*1,314,016**
2045	*18,393**	*61,667**	*1,319,089**

**** SEMCOG projections:*** **https://semcog.org/population-estimates**

Recent projections for the next 20 years show the population to have a slight increase from the 2020 Census in the District. Data shows the population slightly increased after 2010, decrease slightly after 2020, then continue to increase after 2030.

For the purposes of this CWSRF project plan, a 20-year projection is required for calculations of future system demand and total present worth. Forecast from SEMCOG projects population in 2045 to be approximately 18,393. See Appendix A for attached documentation of contact with the SEMCOG, notifying them of this proposed Project Plan.

2.2.1 Economic Characteristics

The Augusta Drain Drainage District is located entirely within the City of Pontiac with costs paid through the City's general fund. The median household income for the City of Pontiac is $36,214 and the average taxable value is $14,274. The median household income is significantly lower than the median Michigan household income of $63,498 and the City (and therefore the District) meets EGLE's criteria for "Significantly Overburdened." See Appendix G for the Overburdened and Significantly Overburdened Community Status Determination Worksheet.

2.3 EXISTING ENVIRONMENT EVALUATION

2.3.1 Cultural Resources:

Oakland County is committed to preserving and protecting historical sites. The Michigan State Historic Preservation Act provides local governments, non-profits, and property owners with historic preservation services and training. The *National Archives NextGen Catalog* was consulted to determine the Historic Places located within the City of Pontiac *(https://catalog.archives.gov/id/25337646)*. The National Register of Historic Places noted key historic sites within the City of Pontiac: Casa del Ray Apartments, Central Highschool, Eastern Michigan Asylum Historic Society, Eastern Michigan Asylum Historic District (Boundary Decrease), Fairgrove Avenue Historic District, Franklin Boulevard Historic District, Grinnell Brothers Music House, Howard, Horatio N. House, Modern Housing Corporation Addition Historic District, Myrick-Palmer House, Oak Hill Cemetery, Pontiac Commercial Historic District, Pontiac Commercial Historic District (Boundary Increase), St. Vincent DePaul Catholic Church, Convent, and School, and Wisner House. While some of the Historical Sites are located within the proposed Project Area, the work being done will not impact the historical sites listed above.

2.3.2 Air Quality:

Through the use of the EGLE Air Monitoring Site Map website (see link below), it has been determined that Oakland County is in compliance with all applicable standards. This project, and the alternatives discussed will have no impact on the quality of the air in the Project Area. None of the NESHAP or Natural Resources and Environmental Protection Act (NREPA) regulations are anticipated. However, if encountered prior to or during the design and construction phases all hazardous wastes, liquid industrial by-products, solid wastes (including contaminated soils), building materials containing asbestos shall be managed accordingly and disposed of properly.
(https://egle.maps.arcgis.com/apps/webappviewer/index.html?id=9a4c80a5c7fa4088971757504a3c0ba1)

2.3.3 Wetlands:

There are areas identified as wetlands on the National Wetlands Inventory (NWI) or Michigan Resource Information System (MIRIS) Land Cover maps within the drainage district or associated with the proposed limits of work. The proposed work will be located mainly within the Drain easements and roadway rights-of-way. Since the proposed work will be rehabilitating existing storm pipes and structures, no impacts to any existing wetland areas are expected. However, for final design, any wetlands that may be impacted would be flagged, applications for the appropriate permits will be submitted and necessary mitigation measures will be undertaken to protect the influenced wetlands. However, it is not anticipated to be an issue for this project. The wetland map for the Augusta Drainage District is shown in Figure 2-2.

2.3.4 Great Lake Shorelands, Coastal Zones, and Costal Management Areas:

There are no coastal zones located with the Project Area and therefore no impacts are anticipated.

2.3.5 Floodplains:

We have identified various floodplains located within the Augusta Drain Drainage District based on the Flood Insurance Rate Maps (FIRM) on the Federal Emergency Management Agency (FEMA) website. Since the proposed work will be rehabilitating existing storm pipes and structures no impacts to any existing floodplains are expected. However, if isolated excavations must be located within the 100-year floodplain, construction will only be undertaken after first contacting EGLE and obtaining the appropriate permits. Appropriate mitigation measures and soil erosion efforts will be undertaken to protect the floodplains and surface waters influenced by the project, including but not limited to silt fences, turbidity curtains, stone check dams, gravel access drives, rip-rap, etc. Additionally, excavations will be filled with appropriate backfill materials, compacted and restored to existing grade with surface restoration matching existing vegetation. The floodplain map for the Augusta Drainage District is shown in Figure 2-5.

2.3.6 Natural or Wild and Scenic Rivers:

Figure 2-6 and Figure 2-7 show that there are no state-designated rivers within the project limits. Therefore, this proposed project should not interface with any River that is considered a state-designated segment.

2.3.7 Major Surface Waters:

The Augusta Drain Drainage District has various inland lakes and ponds throughout the district including Harris Lake, Terry Lake, and Osmun Lake. These waterways are tributaries for the Clinton River which enters Lake St. Clair. Some waterways are located within parks which allows the public access to the waterway, while other

waterways are surrounded by residential areas with only private access to the waterway. While various inland waterways are present throughout the Drainage District, the proposed rehabilitation work will be conducted on the existing storm pipes and structures and will have no impact on any existing major surface waters.

2.3.8 Topography:

The terrain within the Augusta Drain District is characterized by a sloped topography generally decreasing from west to east and ranging from 1,093 to 857 feet throughout the District.

2.3.9 Geology:

The Augusta Drain District and surrounding area is typified by Coldwater Shale bedrock, overlain by a thin layer of unconsolidated glacial deposits. The sedimentary strata were deposited during the Mississippian period in the Michigan Basin (360 to 325 million years old); just above or below sea level. The sedimentary deposits consist primarily of sand and gravel.

2.3.10 Soil Types:

According to the United States Department of Agriculture (USDA) online Web Soil Survey, the project area consists of a variety of different types of soils, the most common types of soil are: Urban Land, Loam, Complex, Sand, and Pits.

2.3.11 Agricultural Resources:

There is no agricultural land located within the Project Area limits. Therefore, no agricultural resources will be impacted by the proposed work. See Figure 2-4 for the land use map and Figure 2-1 for an aerial map of the Augusta Drain District for concurrence with this determination.

2.3.12 Fauna and Flora:

Please see the following table a complete list of all fauna and flora species within the Project Area that are deemed as threatened, endangered, or in a state of special concern. The work being done in the Project Area will not directly impact any of the species discussed in this section.

Table 2-3. Oakland County Flora and Fauna Status

MSU Extension Michigan Natural Features Inventory Element Data: OAKLAND COUNTY

Scientific Name	Common Name	Federal Status	State Status	# in County	Last Seen in County	Scientific Name	Common Name	Federal Status	State Status	# in County	Last Seen in County
Epioblasma triquetra	Snuffbox	LE	E	7	2020	Pantherophis spiloides	Gray ratsnake		SC	1	1992
Villosa fabalis	Rayed bean	LE	E	4	2019	Dichanthelium microcarpon	Small-fruited panic-grass		SC	1	1986
Epioblasma rangiana	Northern riffleshell	LE	E	1	1935	Amorpha canescens	Leadplant		SC	1	1985
Bombus affinis	Rusty-patched bumble bee	LE	SC	4	1965	Sporobolus heterolepis	Prairie dropseed		SC	1	1985
Oarisma poweshiek	Poweshiek skipperling	LE	T	7	2022	Conioselinum chinense	Hemlock-parsley		SC	4	1971
Nerodia erythrogaster neglecta	Copperbelly water snake	LT	E	1	1963	Erynnis martialis	Mottled duskywing		SC	2	1966
Platanthera leucophaea	Prairie white-fringed orchid	LT	E	1	1850	Bombus terricola	Yellow banded bumble bee		SC	2	1965
Sistrurus catenatus	Eastern massasauga	LT	SC	33	2022	Bombus pensylvanicus	American bumble bee		SC	3	1964
Bouteloua curtipendula	Side-oats grama grass		E	2	2021	Bombus borealis	Northern amber bumble bee		SC	1	1961
Falco peregrinus	Peregrine falcon		E	2	2020	Drosera anglica	English sundew		SC	1	1961
Toxolasma parvum	Lilliput		E	2	2020	Angelica venenosa	Hairy angelica		SC	7	1958
Mertensia virginica	Virginia bluebells		E	2	2019	Mesomphix cupreus	Copper button		SC	2	1947
Simpsonaias ambigua	Salamander mussel		E	1	2019	Pyrgulopsis letsoni	Gravel pyrg		SC	2	1943
Gentiana alba	White gentian		E	2	2018	Microtus pinetorum	Woodland vole		SC	1	1935
Notropis anogenus	Pugnose shiner		E	5	2018	Myotis lucifugus	Little brown bat		SC	1	1928
Clinostomus elongatus	Redside dace		E	2	2012	Smilax herbacea	Smooth carrion-flower		SC	1	1927
Centronyx henslowii	Henslow's sparrow		E	2	2007	Pyganodon lacustris	Lake floater		SC	2	1925
Ligumia recta	Black sandshell		E	3	2004	Moxostoma duquesnei	Black Redhorse		SC	1	1924
Toxolasma lividus	Purple lilliput		E	3	2004	Hybanthus concolor	Green violet		SC	1	1921
Setophaga discolor	Prairie warbler		E	1	2003	Cincinnatia cincinnatiensis	Campeloma spire snail		SC	2	1918
Noturus stigmosus	Northern madtom		E	1	2002	Boechera missouriensis	Missouri rock-cress		SC	2	1916
Castanea dentata	American chestnut		E	4	1981	Cirsium hillii	Hill's thistle		SC	1	1896
Ambystoma texanum	Smallmouth salamander		E	1	1963	Graphephorum melicoides	Purple false oats		SC	1	1895
Speyeria idalia	Regal fritillary		E	2	1949	Buteo lineatus	Red-shouldered hawk		T	4	2022
Catinella protracta	A land snail (no common name)		E	1	1946	Clemmys guttata	Spotted turtle		T	7	2021
Platanthera ciliaris	Orange- or yellow-fringed orchid		E	3	1946	Silphium laciniatum	Compass plant		T	1	2021
Agalinis gattingeri	Gattinger's gerardia		E	1	1914	Alasmidonta viridis	Slippershell		T	20	2020
Gentiana puberulenta	Downy gentian		E	1	1848	Coregonus artedi	Lake herring or Cisco		T	9	2020
Lasmigona costata	Fluted shell		SC	1	Historical	Cypripedium candidum	White lady slipper		T	15	2019
Sphaerium fabale	River fingernail clam		SC	1	Historical	Lampsilis fasciola	Wavyrayed lampmussel		T	7	2019
Ventridens suppressus	Flat dome		SC	2	Historical	Muhlenbergia richardsonis	Mat muhly		T	8	2019
Papaipema beeriana	Blazing star borer		SC	3	2022	Panax quinquefolius	Ginseng		T	6	2019
Emydoidea blandingii	Blanding's turtle		SC	50	2021	Silphium integrifolium	Rosinweed		T	1	2018
Euonymus atropurpureus	Wahoo		SC	3	2021	Eutrochium fistulosum	Hollow-stemmed Joe-pye weed		T	2	2017
Haliaeetus leucocephalus	Bald eagle		SC	5	2021	Nelumbo lutea	American lotus		T	2	2016
Lithobates palustris	Pickerel frog		SC	11	2021	Asclepias sullivantii	Sullivant's milkweed		T	1	2012
Pandion haliaetus	Osprey		SC	20	2020	Hydrastis canadensis	Goldenseal		T	9	2010
Pleurobema sintoxia	Round pigtoe		SC	11	2020	Morus rubra	Red mulberry		T	2	2010
Ptychobranchus fasciolaris	Kidney shell		SC	6	2020	Erynnis persius persius	Persius dusky wing		T	1	2007
Venustaconcha ellipsiformis	Ellipse		SC	2	2020	Flexamia huroni	Huron River leafhopper		T	5	2007
Villosa iris	Rainbow		SC	14	2020	Polemonium reptans	Jacob's ladder		T	1	2005
Alasmidonta marginata	Elktoe		SC	6	2019	Poa paludigena	Bog bluegrass		T	1	2004
Nycticorax nycticorax	Black-crowned night-heron		SC	2	2019	Setophaga cerulea	Cerulean warbler		T	4	2002
Brickellia eupatorioides	False boneset		SC	1	2018	Fraxinus profunda	Pumpkin ash		T	3	2001
Cambarus robustus	Big water crayfish		SC	5	2018	Fuirena pumila	Umbrella-grass		T	1	1987
Carex richardsonii	Richardson's sedge		SC	6	2018	Rhynchospora scirpoides	Bald-rush		T	1	1987
Setophaga citrina	Hooded warbler		SC	11	2017	Asio otus	Long-eared owl		T	1	1970
Lasmigona compressa	Creek heelsplitter		SC	7	2016	Acris blanchardi	Blanchard's cricket frog		T	1	1968
Faxonius immunis	Calico crayfish		SC	1	2015	Galearis spectabilis	Showy orchis		T	11	1958
Melanoplus viridipes	Green-legged grasshopper		SC	1	2015	Viola pedatifida	Prairie birdfoot violet		T	1	1955
Terrapene carolina carolina	Eastern box turtle		SC	3	2014	Gavia immer	Common loon		T	1	1952
Baptisia lactea	White or prairie false indigo		SC	2	2012	Valeriana edulis var. ciliata	Edible valerian		T	2	1947
Oecanthus laricis	Tamarack tree cricket		SC	9	2011	Aristida longespica	Three-awned grass		T	1	1942
Utterbackia imbecillis	Paper pondshell		SC	5	2011	Potamogeton vaseyi	Vasey's pondweed		T	2	1939
Jeffersonia diphylla	Twinleaf		SC	2	2010	Ammocrypta pellucida	Eastern sand darter		T	1	1938
Calephelis muticum	Swamp metalmark		SC	4	2008	Cryptotis parva	Least shrew		T	1	1937
Meropleon ambifusca	Newman's brocade		SC	1	2008	Linum virginianum	Virginia flax		T	3	1936
Ammodramus savannarum	Grasshopper sparrow		SC	4	2007	Cyperus acuminatus	Cyperus, Nut grass		T	1	1928
Lepyronia angulifera	Angular spittlebug		SC	1	2007	Gentianella quinquefolia	Stiff gentian		T	1	1923
Cistothorus palustris	Marsh wren		SC	1	2006	Carex lupuliformis	False hop sedge		T	1	1918
Linum sulcatum	Furrowed flax		SC	2	2006	Trillium sessile	Toadshade		T	1	1918
Noturus miurus	Brindled madtom		SC	3	2005	Trichostema dichotomum	Bastard pennyroyal		T	1	1916
Trichophorum clintonii	Clinton's bulrush		SC	4	2003	Astragalus canadensis	Canadian milk vetch		T	1	1914

LEGEND:
E-Endangered, T-Threatened, SC-Special Concern

SOURCE: Michigan State University Extension, Michigan Natural Features Inventory
https://mnfi.anr.msu.edu/resources/county-element-data **2/17/23**

2.3.13 Climate:

The project area's climate is controlled by its location with respect to major storm tracks that pass through the Midwest and by the influence of the Great Lakes. The normal wintertime storm track is southeast of the Augusta Drain Drainage District and most passing storms bring periods of snow or rain. The Great Lakes tend to moderate and smooth out most climate extremes. Precipitation is distributed through all months of the year. The most pronounced effect on the climate by the Great Lakes occurs in the colder part of the winter. Arctic air moving across the lakes is warmed and moistened. Cold waves approaching from the northern plains are reduced in intensity, which lessens the severity of these events. However, there is also an excess of cloudiness and very little sunshine in the winter.

Summers in the Detroit metropolitan area are warm and sunny. Showers usually occur every few days, but often fall on only part of the Metropolitan Detroit area. Extended periods of drought are unusual. Each year, there are two or three series of days with temperatures in the nineties. The highest temperatures are often accompanied by high humidity. In winter, skies are cloudy and temperature averages near the freezing point. Day to day changes typically is not significant. The temperature drops to near or a little below zero once or twice each year. Winter storms may bring rain, snow, or both. Freezing rain and sleet are not unusual. Snowstorms average about three (3) inches of accumulation, but heavier amounts are recorded several times each year.

The growing season averages 180 days in length and historically has ranged from 145 days to 205 days. The average date of the last freezing is April 23; average date of the first freezing temperature is October 21.

Climatological data is collected by the National Oceanic and Atmospheric Administration (NOAA) at Detroit Metropolitan Wayne County Airport. This project, and the alternatives discussed, will have no impact on the climate of the project area.

2.3.14 Environmental Contaminants:

EGLE's Environmental Contaminants online mapper was used to determine that no known contaminants are anticipated to be located within the project areas. However, if encountered prior to or during the design and construction phases EGLE shall be notified immediately and all environmental contaminants shall be managed accordingly.

2.4 EXISTING SYSTEM

2.4.1 General:

The Oakland County Water Resources Commissioner's Office is responsible for the design, construction, operation, and maintenance of over 500 stormwater management systems and flood control systems within Oakland County. This includes approximately 500 miles of drains. These range from open channel flow to enclosed systems and lake level controls. Additionally, Oakland County has storm sewer conveyance systems with numerous inlets and catch basins.

All developments discharged to a county-owned system must follow Oakland County's Stormwater Engineering Design Standards. Most communities have also adopted the County's Design Standards, and both new developments and redevelopments are subject to these standards. If construction exceeds one acre of land, then channel protection rate control, channel protection volume control, water quality control, and detention and flood control storage are to be provided. Discussion of the existing municipal sewage conveyance, treatment, and

disposal facilities are not applicable to the proposed stormwater improvement projects. Next section describes the regular county drain maintenance for this drain.

2.4.2 System Assets:

The Augusta Drain Drainage District was originally formed in approximately 1968 with construction being completed in approximately 1973. The District consists of only stormwater assets including:

- 74 drain catch basins
- 135 drain manholes
- 13 direct inlets
- 17 drain pipe outlets
- Drop Fall Structure and Junction Chamber
- 4,480 lineal feet of pipe with 237 segments of gravity storm pipe
- Open channel sections

2.4.3 System Operation and Maintenance:

Construction for the Augusta Drain began in 1969 and was completed in 1970. The Drain was designed to control overflow from local water sources, direct stormwater, and to connect municipal drains to the Pontiac-Clinton River No. 1 Drain. The Augusta Drain includes two open channel segments near Lake Osmun and the Norton channel as well as segments of pipes located in the downtown Pontiac area. In addition, the August Drain includes segments that flow from the Pontiac-Clinton River No. 1 Drain to the Clinton River.

No major rehabilitations have been completed since the Augusta Drain was constructed to date, rather than regular the County Drains maintenance.

2.4.4 Climate Resiliency:

The system is somewhat susceptible to climate impacts, particularly flooding if rainfall amounts and intensities continue to increase. The proposed projects are intended to provide additional resiliency by insuring they can continue to meet at least existing design criteria.

2.5 NEED FOR PROJECT

OCWRC has decided to take action to improve its stormwater system and water quality within the Augusta Drain Drainage District.

2.5.1 Drop Fall Structure

As part of the AMP previously completed for the Augusta Drain, onsite structural assessment was conducted on the drop fall structure and junction chamber on September 11, 2018. It was determined that the drop fall structure and junction chamber adjacent to it are both in a state of failure. If no action is taken within the drop fall structure and junction chambers, they will continue to fail, and the structures lose their performance and reliability. If the drop fall structure fails, the water from upstream rushes into the downstream channel and causes flooding and harmful impact to the public health and downstream properties. In addition to that, sediment and other pollutants will be delivered to the water bodies and negatively impact water quality.

The purpose of the drop fall structure in the Augusta Drainage District is to manage the flow of water in the drainage system and prevent downstream flooding. Drop fall structures in drainage systems regulate water flow

and maintain a specific water level in the channel and lake. By controlling the SW of water, drop fall structures help to reduce the risk of flooding in low-lying areas downstream and protect properties and communities. It can also help to prevent erosion, maintain water quality, and conserve water resources in the drainage district.

2.5.2 Enclosed Storm Sewer System

As part of 2019 SAW grant, a condition assessment was completed on the storm sewer system including pipes, manholes, catch basins, inlets, and access structures. All pipes that have been televised and were found to have a NASSCO PACP structural defect score of 4 or 5 were evaluated to prioritize required rehabilitation work and the most cost-effective rehabilitation method.

Manholes and other structures within the Augusta Drain District system were also inspected. This data was reviewed to identify structural assets with NASSCO MACP structural scores of 4 or 5. These structures have also been individually evaluated to prioritize required rehabilitation work and the most cost-effective rehabilitation method. Because the AMP was undertaken several years ago, WRC used their asset management program to review all assets in the system and update the proposed Capital Improvement Plan. A copy of the AMP from the SAW grant and the updated asset rehabilitation list, generated from WRC's asset management software, is provided in Appendix F.

It was determined that there are several areas of high consequence that pose a high risk of failure. If no action is taken within the pipes, manholes, and storm structures, they will continue to fail, and the assets lose their performance and reliability.

2.5.3 Non-Point Source Controls

Park upgrades have been deemed necessary within North Kiwanis Park, also known locally as Stanley Park. The area of North Kiwanis Park surrounds Osmun Lake and features a fishing pier as well as playground equipment. In recent years, the City has installed a new park entryway sign, new playground equipment, and new benches and picnic tables.

The installation of a riparian buffer strip to maintain a natural vegetative buffer at the edge of Osmun lake to reduce stormwater runoff was identified to help reduce pollutant loading to the area surface waters, as well to remove invasive plants from the lake shore.

2.5.4 General

The projects proposed in the Alternatives Analysis will help reduce stormwater pollutants and better manage flow in Augusta Drain by rehabilitating the storm pipes, the structures and the drop fall structure. Without the proposed projects, the pipes and structures will continue to deteriorate and be at risk of sudden failure, which will not only cause flooding but also increase the amount of sediment into the surface waters.

The additional non-point source project proposed will provide additional water quality by naturally preventing pollutants from entering the surface water of the Clinton River. Focusing on the pollutant removal within the drainage district will help the County archive EGLE's enforced Total Maximum Daily Load (TMDL) for phosphorous, Escherichia coli (E. coli), dissolved oxygen (D.O.) and biota. The Oakland County Water Resources Commissioner (WRC) welcomes any funding available to assist with the District to rehabilitate this aged system at a minimal cost to a community with limited financial resources.

2.6 PROJECTED FUTURE NEEDS:

An extensive review of the Clinton River and its contributing waterways within Oakland County by EGLE has led to the establishment of several TMDLs in the County. The measures were taken to put limits on pollutant discharge to the watershed, thereby improving water, habitat, and biotic quality. The Augusta Drain Drainage District would be directly impacted by stormwater improvements implemented within the study area.

Oakland County, along with its internal municipalities, has engaged in a multi-year effort to achieve the requirements of the established TMDLs via multiple watershed management plans, which includes the Clinton Main Subwatershed Management Plan (2010). Associated volume reductions will improve hydrologic conditions throughout the study area and limit downstream hydraulic impacts. These initiatives rely on a variety of pollution:

- Improve water quality and reduce sources of pollution that threaten public health
- Reduce runoff impacts through sustainable stormwater management strategies and programs
- Increase the public's understanding of their role in protecting, restoring, and enhancing water quality
- Promote and enhance recreational opportunities in the subwatershed
- Maximize community assets related to the watershed
- Support regional partnerships, for the implementation of the watershed management plan

The projects within this Project Plan are located within the Augusta Drain Drainage District which targets the pollutant *E. coli.* Projects that focus on total suspended solids (TSS) reduction and infiltration will be beneficial to work towards the existing *E coli.* TMDL. EGLE does not issue TMDLs for TSS.

Taken holistically, all of the alternative locations work toward the common goal of pollutant removal while simultaneously striving to meet the requirements of the local TMDLs.

The County has also anticipated that possible upgrades, improvements and repairs to the existing storm pipes and structures will be needed within the 20 year planning period. OCWRC has a comprehensive Asset Management Program that includes a GIS inventory of assets, computerized maintenance management system (CMMS, currently Cityworks) that manages work orders and costs, and an asset optimization software package (currently PowerPlan AIO) that is used to track and estimate future investment needs. The proposed improvement projects have been coordinated with these future needs.

2.6.1 NPDES Permit

The NPDES permit program aims to protect water resources by addressing point source water pollution. Initiated by Clean Water Act in 1972, the NPDES permit program controls the discharge of pollutants into surface waters by imposing effluent limitations to protect water quality. Although NPDES is a federal program, Michigan has been granted the authority to implement the program. Most stormwater outfalls into the Clinton River and contributing waterways within Oakland County are permitted NPDES Municipal Separate Storm Sewer Systems (MS4) under the jurisdiction of Oakland County and each individual Community's permit. The permits have six minimum requirements that must be maintained for compliance.

A copy of the current NPDES stormwater permit for the County is included in Appendix I.

Orders

This section is not applicable to this Project Plan. There have been no water quality orders of any kind. Some municipalities within the County have Administrative Consent Orders related to sanitary sewer and/or combined sewer outflows, but they do not apply to these projects.

Water Quality Problems, Point and Nonpoint Sources of Pollution

The priority of Oakland County and its communities is to improve stormwater quality and strive to meet the goals of the watershed and asset management plans as previously stated.

WRC received a Stormwater, Wastewater and Asset Management (SAW) Grant on behalf of Augusta Drain Drainage District to develop Asset Management Program (AMP) for its stormwater system through EGLE. The scope of work performed as part of the individual system's SAW grant for Augusta Drain Drainage District included reviewing the inventory of assets and establishing the baseline condition of the assets, prioritizing assets by estimating the overall risk associated with each asset, developing level of service goals and performance measures for the system, reviewing the operation and maintenance needs of the system and determining the required revenue to support those needs, and developing a capital improvement plan for renewal of large assets in the system. This work was performed using the overall Common to All program, with modifications made where needed to better represent this individual system. As part of 2019 SAW grant, the condition assessment was completed on the storm sewer system including pipes, manholes, catch basins, inlets, access structures, and outfalls. Defects that are found are weighted with scores on a severity scale of 1 to 5, with 1 meaning the defect is minor and 5 indicating the defect is significant.

Implementation of the stormwater improvements and management practices proposed in this Plan will help achieve those goals identified in the watershed and asset management plans.

Public involvement will be an integral part of the project implementation. Involving the public in the Project Plan development process and increasing the public awareness of the improvements that result from the projects will elevate the public's understanding of their role in protecting and enhancing watershed resources.

The target pollutant associated with stormwater runoff that will be reduced due to the proposed project identified in this Plan is Sedimentation and *E. coli.*

Sedimentation is when particulates settle out of the water. When large amounts of sediment start to settle out, they can clog the pipes, reduce the hydraulic capacity and deteriorate water quality. Sediment can carry pollutants such as chemicals, heavy metals, bacteria into the water body and degrade its overall water quality. Sedimentation is made worse by urban development, industrial activities, agriculture, dredging, channel alterations. The purpose of the TMDL created for sedimentation is to restore water quality to improve the natural habitats, macroinvertebrate populations, and fish populations.

E. coli is a bacterium that can enter the watershed from animal waste and other sources. This is a significant pollutant in the State of Michigan, specifically Oakland County. This has been established through Michigan's Statewide established TMDL for *E coli* (2019) as well as the Lower Clinton River's TMDL (2010). The sources have been attributed, in part, to stormwater runoff caused by urban development. For additional details, see Appendix H regarding the *E. coli* TMDLs.

The proposed improvement projects within this plan are intended to improve conveyance capacity, reduce sediment deposition, and improve water quality.

Unsewered Areas

Municipal sanitary and county interceptor sewer systems generally serve the project areas. Some of the northern properties remain unsewered and served by private on-site systems. Therefore, actions taken upon private systems are not applicable to this Plan.

Septage Disposal

There are no identified septage disposal problems near the proposed improvement project locations.

2.6.2 Future Environment without the Proposed Project

If the work in this Plan were not undertaken, there is the likelihood that the environmental conditions will not improve and potentially worsen within the Augusta Drain Drainage District. There must be reductions in sediment and *E. coli* inputs to achieve the established TMDLs. Otherwise, these pollutants will continue to have severe consequences on the environment within the area.

Failure to sustainably reduce *E. coli* colonies will likely result in continued Beneficial Use Impairments (BUI) for recreational activities downstream of the projects. High frequency and large volume peak flows will increase, leading to more issues from nutrient loading, flooding, downstream thermal changes, and loss of aquatic habitat associated with sedimentation. As a result, recreational opportunities provided by the Clinton River waterway will continue to diminish, and property owners may experience increased flooding conditions and property impacts. The County and municipalities are being proactive in implementing highly visible BMPs on their properties and are setting an example and encouraging developers and property owners to incorporate BMPs into the plans for development and redevelopment.

The proposed improvement projects within this plan are intended to improve/restore conveyance capacity, reduce sediment deposition, and improve water quality.

Figure 2-1. Augusta Drain Drainage District Map

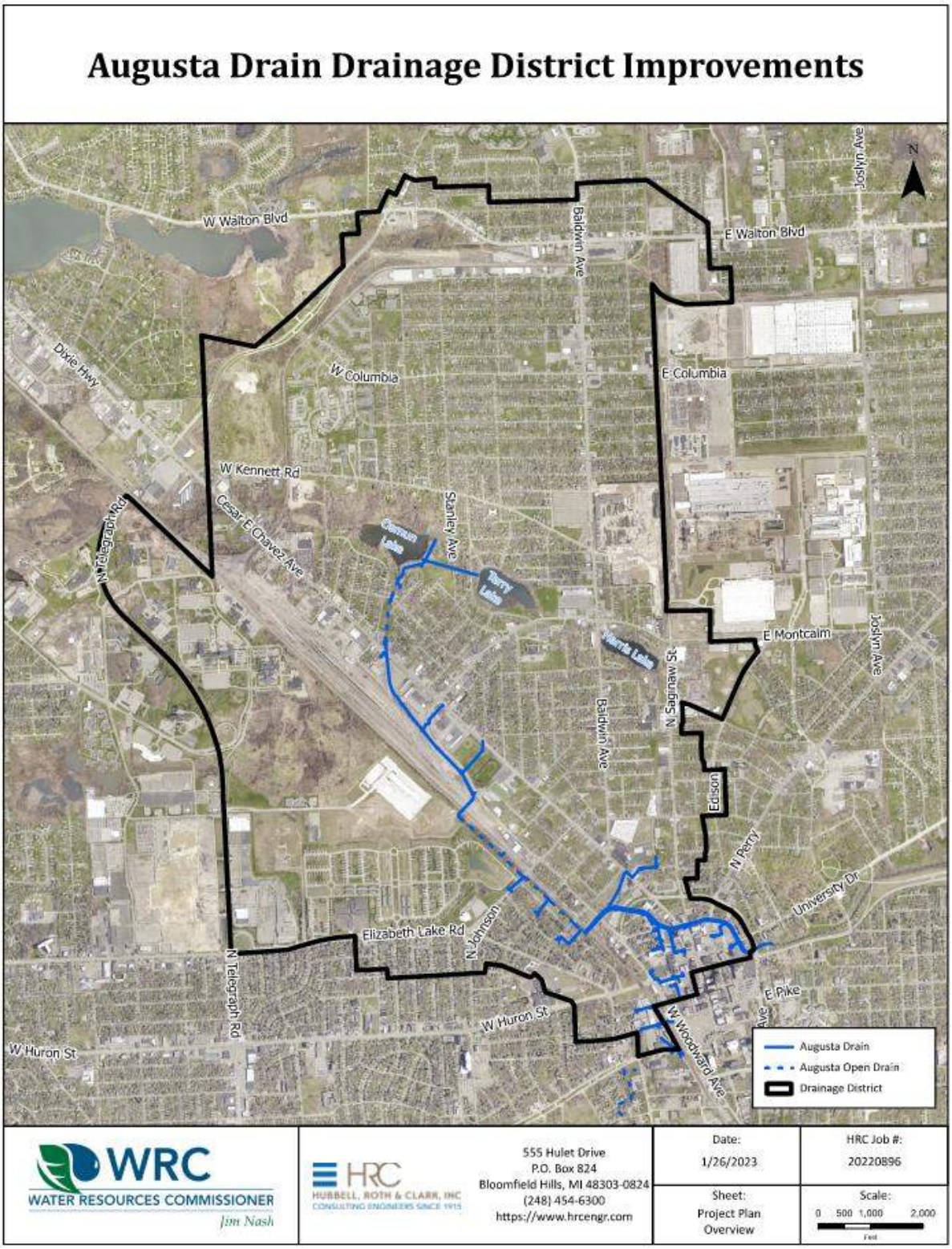


Figure 2-2. Augusta Drain Drainage District National Wetland Map

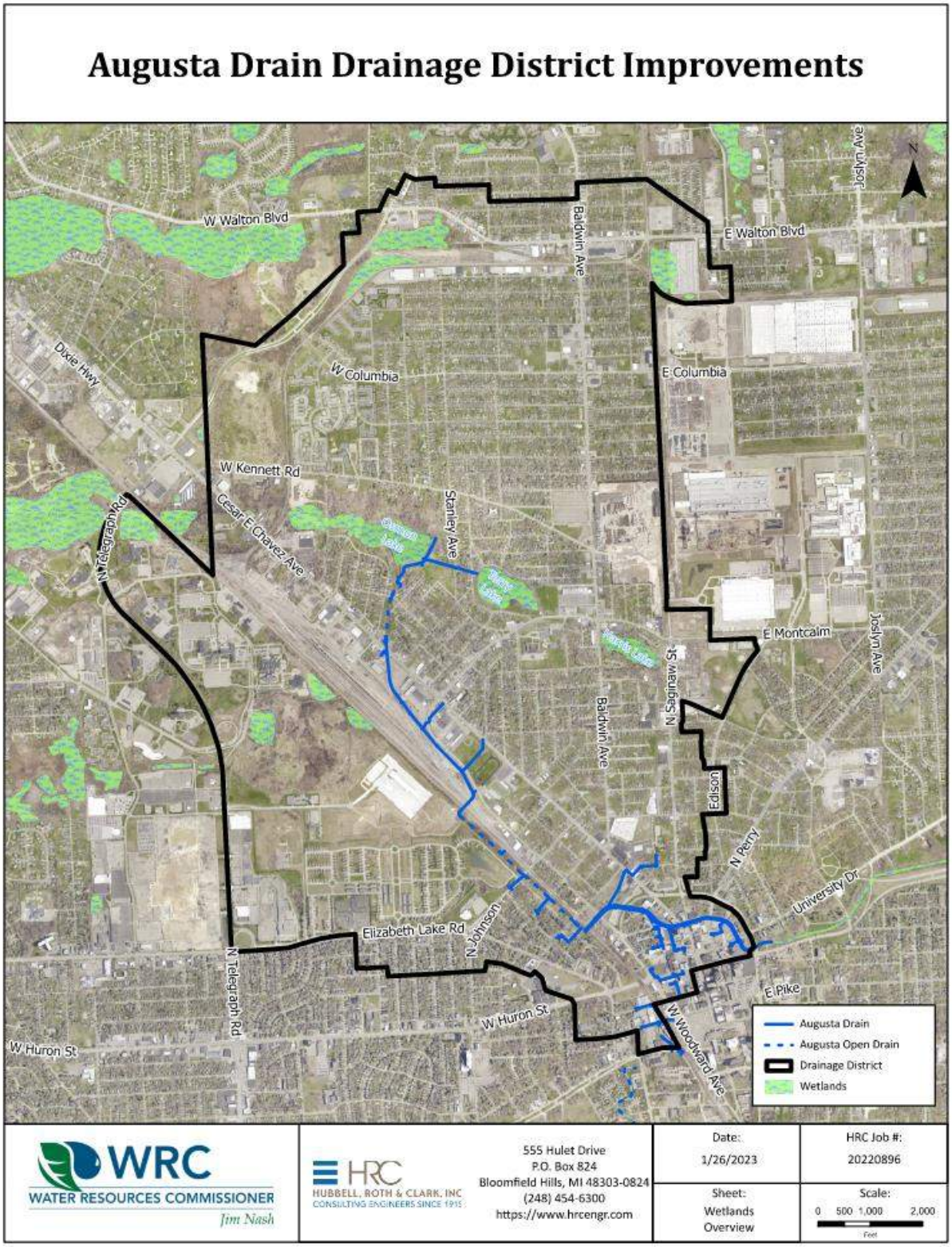


Figure 2-3. Augusta Drain Drainage District Parks and Recreation Map

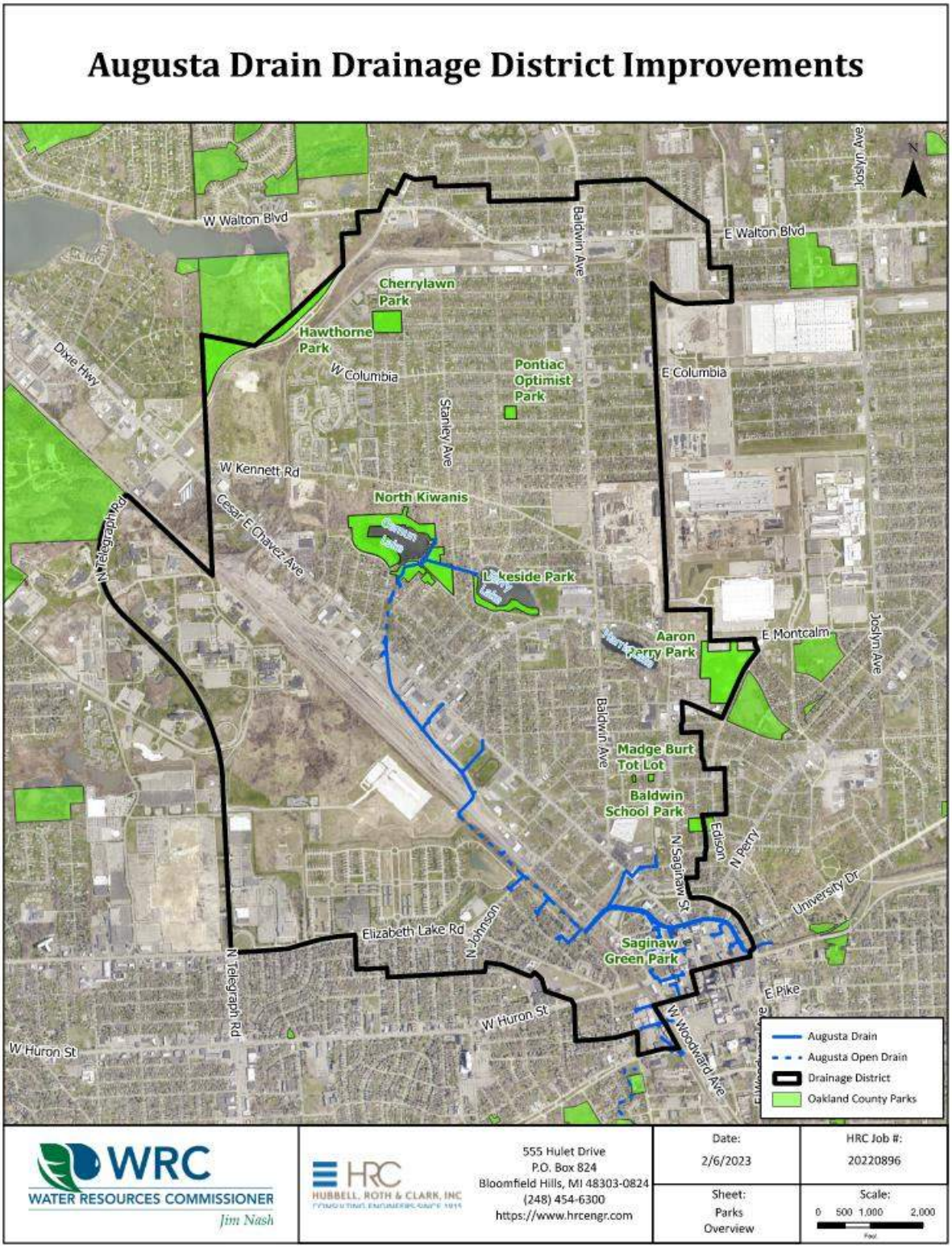


Figure 2-4. Augusta Drain Drainage District Land Use Map

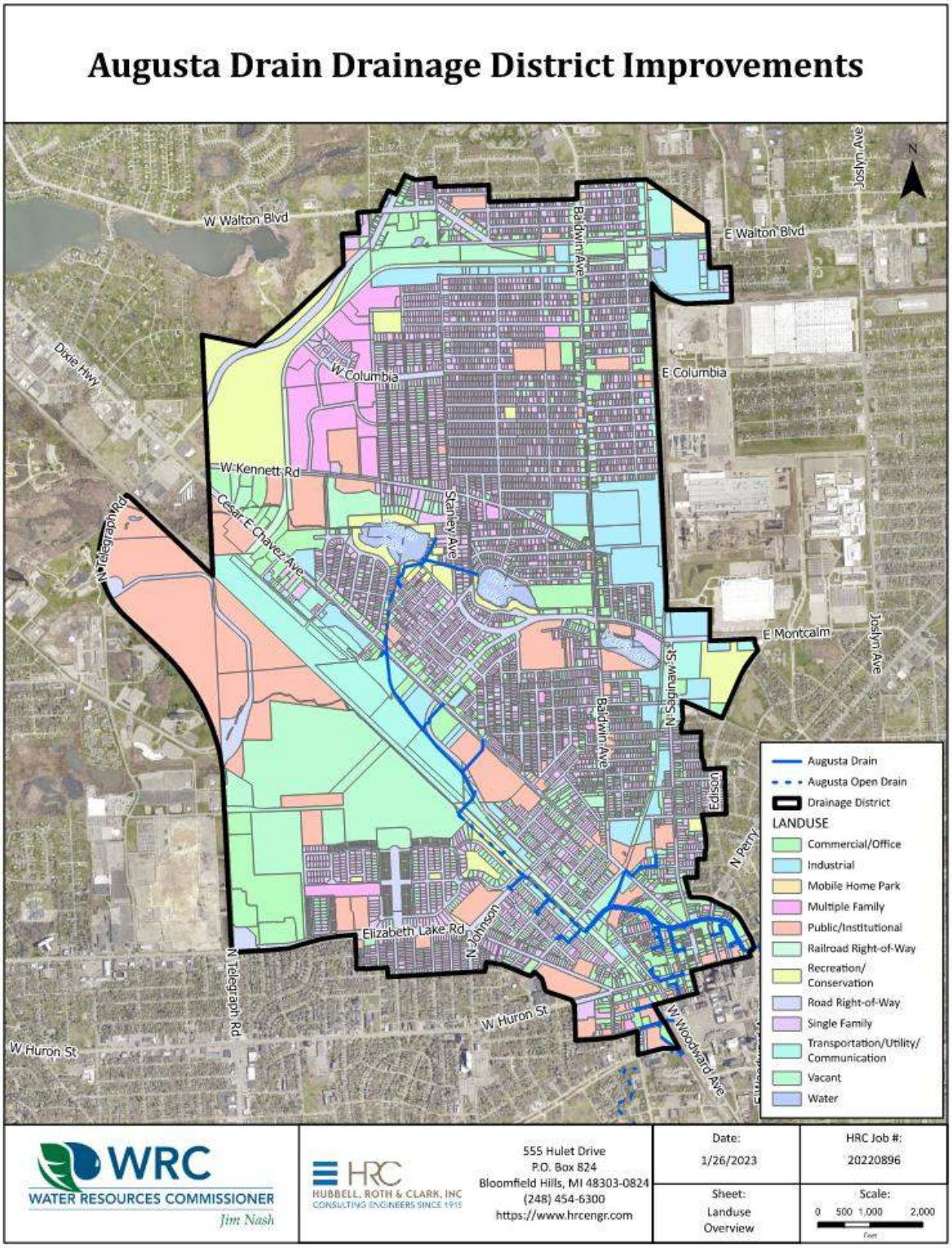


Figure 2-5: Augusta Drain Drainage District Floodplain Area

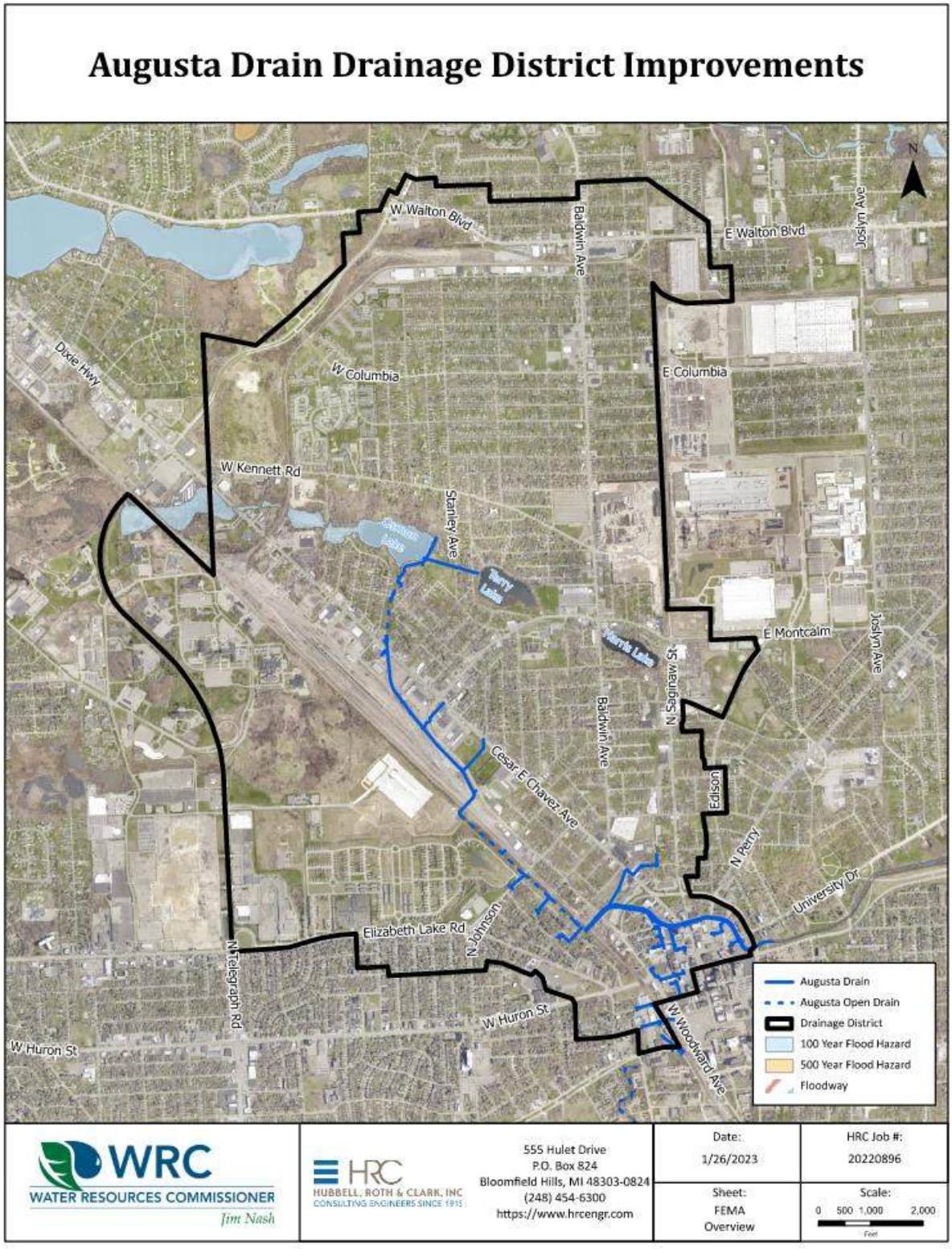


Figure 2-6: National River Inventory Map

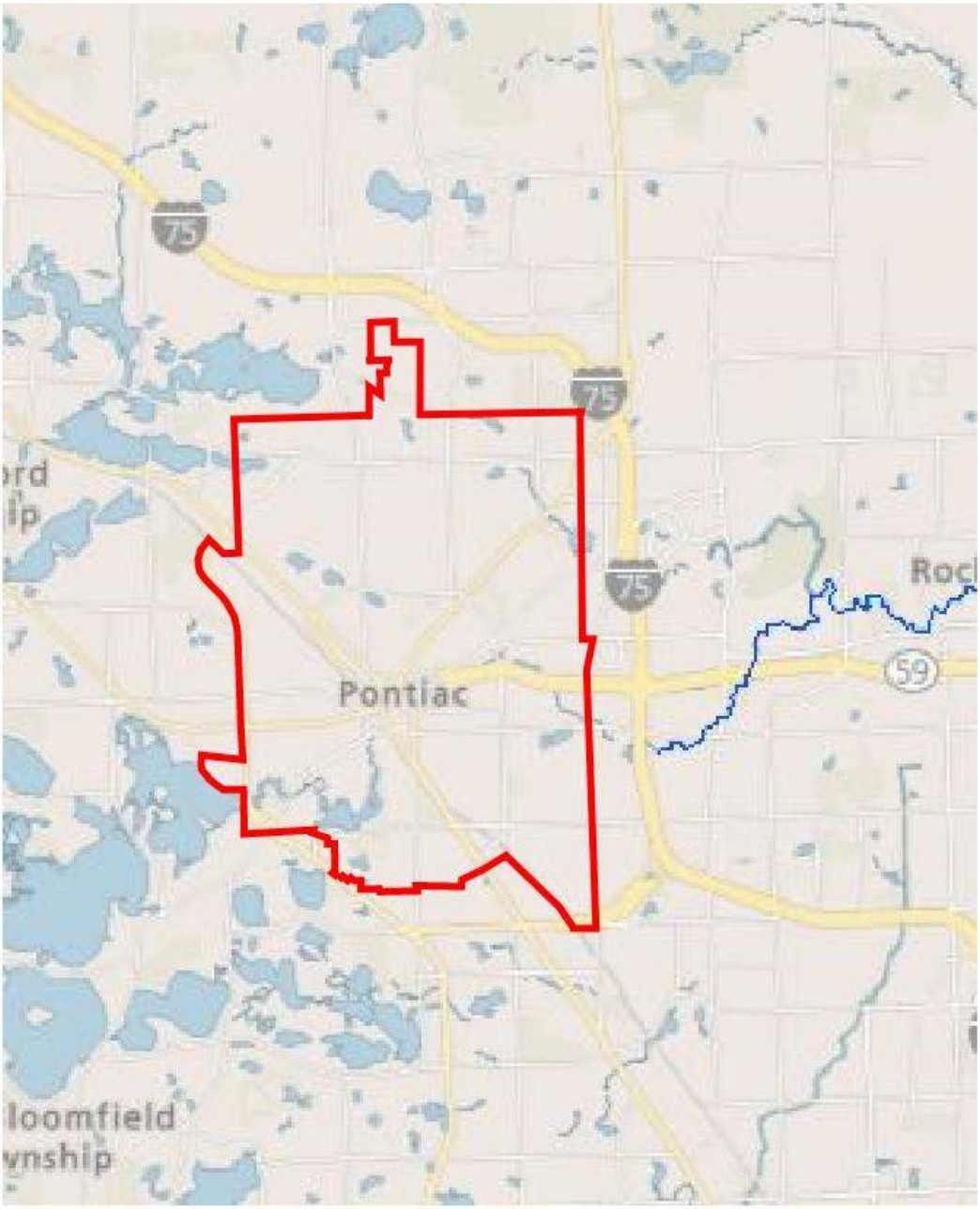


Figure 2-7: Michigan Natural River Inventory Map

AU SABLE RIVER	BETSIE RIVER	BOARDMAN RIVER	FLAT RIVER
FOX RIVER	HURON RIVER	JORDAN RIVER	LOWER KALAMAZOO
PERE MARQUETTE	PIGEON RIVER	PINE RIVER	RIFLE RIVER
ROGUE RIVER	TWO HEARTED RIVER	UPPER MANISTEE RIVER	WHITE RIVER

Figure 2-8: Augusta Drain Drainage Soil Map

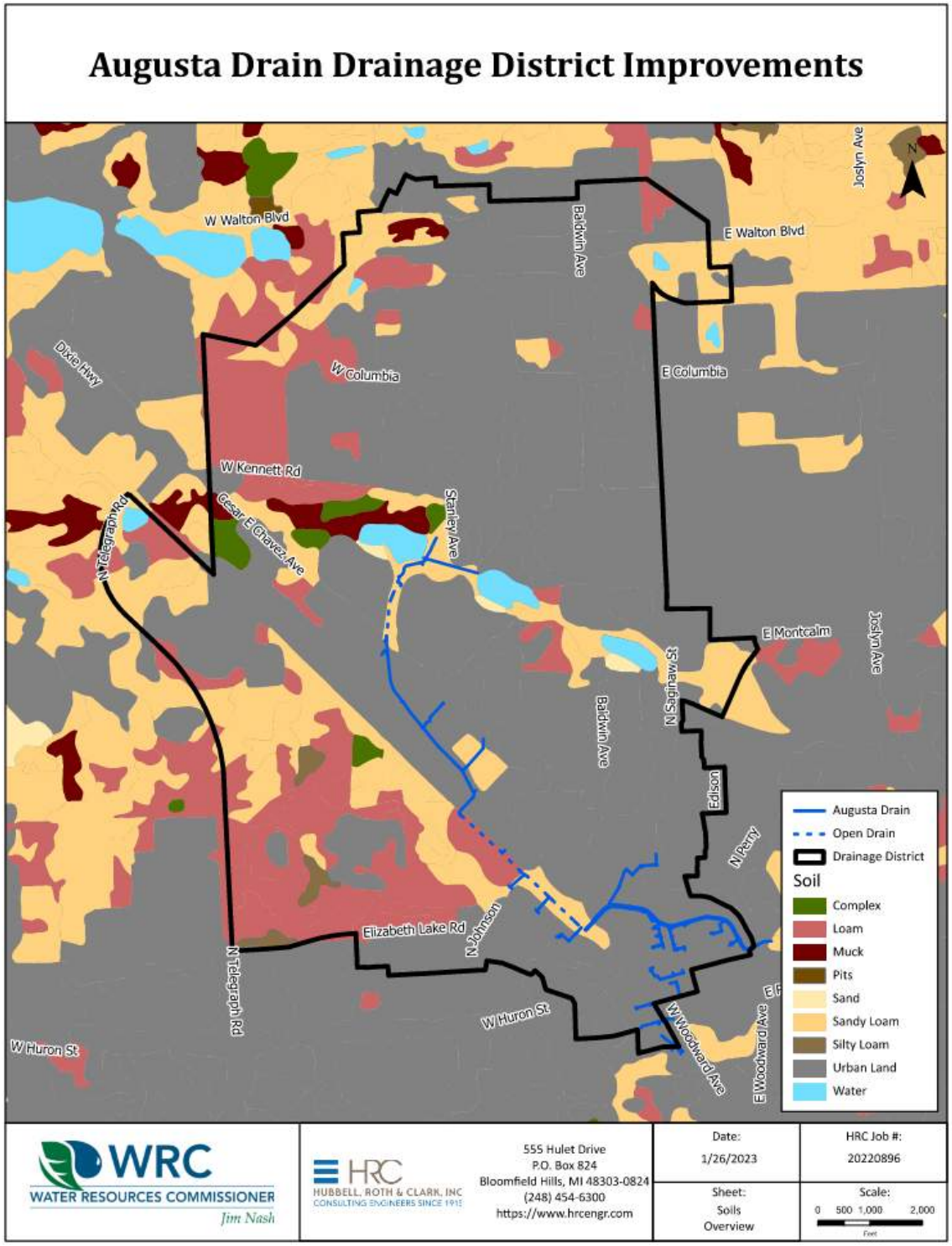
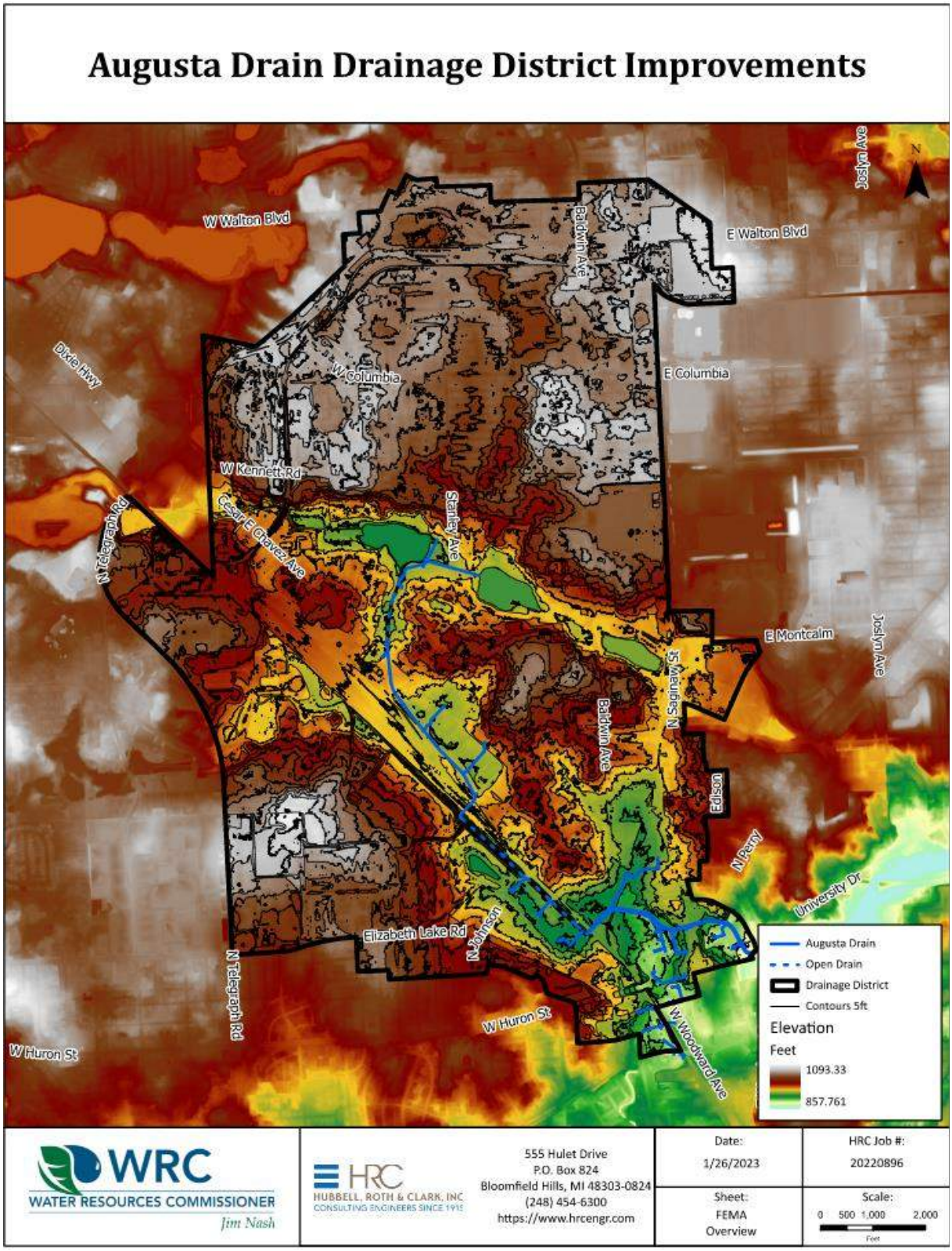


Figure 2-9: Augusta Drain Drainage Topography Map



SECTION 3.0 — ANALYSIS OF ALTERNATIVES

There are three primary projects that are required to address deficiencies in the existing system that are being evaluated as part of this Project Plan, as follows:

- Project 1 – Drop Fall Structure and Junction Chamber Improvements
- Project 2 – Storm Pipes and Structures Improvements
- Project 3 – Nonpoint Source Improvement within the Parks Properties

It is important to recognize that each of these projects are in conjunction with the Augusta Drain Drainage District Improvements (inspection, rehabilitation, and repair) that were outlined in the AMP. A technical basis has been developed for each improvement element and an economic comparison of alternatives has been completed for technically viable alternatives.

3.1 PROJECT 1 – DROP FALL STRUCTURE AND JUNCTION CHAMBER IMPROVEMENTS

Augusta Drain Drop Fall Chamber and Junction Chamber were constructed between 1969 and 1970. The drop fall chamber and junction chamber are located approximately 250 feet northwest of 404 Lake Laura Drive in City of Pontiac. Below describes the alternatives to improve these structures.

3.1.1 ALTERNATIVE 1A: NO ACTION

If the County is to take no action and does not make any improvements, then the structures might fail, causing water quality problems and flooding. Therefore, No Action is not a viable alternative.

3.1.2 ALTERNATIVE 1B: OPTIMIZE PERFORMANCE OF EXISTING SYSTEM

The system is currently managed effectively to meet its original basis of design. The alternatives considered will evaluate whether the system shall be rehabilitated or replaced.

3.1.3 ALTERNATIVE 1C: REHABILITATION

The AMP identified the Drop Fall structure and Junction Chamber needs to be repaired to improve water quality and prevent any flooding that might occur when the structures fail. The following rehabilitation measure are recommended:

- Immediate rehabilitation of the Drop Fall Chamber. The Drop Fall Chamber is in a state of failure, with deterioration of underlying struts and failure of steel and concrete beams. Rehabilitation measures need to be taken into consideration including demolition of the existing screen structure, removal of W8 and W10 wales, and replacement of sheet pile walls. Overall replacement of new wales, struts, and screens must also be considered.
- Rehabilitation of the Junction Chamber to extend its service life. Observed cracks in the retaining walls attached to the junction chamber should be repaired using a structural pressure injected epoxy. Failure to repair the retaining walls will ultimately cause the junction chamber to fail. Observed spalls and leaks within the east and west Junction Chamber should be patched and repaired with a cementitious repair material.

A detailed cost estimate can be found in Appendix B.

- **The Engineer's Opinion of Project Cost Estimate for the rehabilitation of the Drop Fall Structure and Junction Chamber is $290,000.**

3.1.4 ALTERNATIVE 1D: COMPLETE REPLACEMENT

Complete replacement of the Drop Fall structure and Junction Chamber would involve demolition of the existing structure, as well as complete replacement of assets such as beams, steel sheet piling, and other features.

A detailed cost estimate can be found in Appendix B.

- **The Engineer's Opinion of Project Cost Estimate for the replacement of the Drop Fall Structure and Junction Chamber $449,000.**

3.2 PROJECT 2 – PIPES AND STORM STRUCTURES REHABILITATION

As part of the SAW Grant that WRC received, the stormwater assets including pipes, manholes, and catch basins owned by Augusta Drain Drainage District system were inspected. The enclosed storm sewer system includes 74 catch basins, 135 drain manholes, 13 drain inlets, 17 drain pipe outlets, 237 gravity storm pipe, and 4,480 lineal feet of drain pipe.

3.2.1 ALTERNATIVE 2A: NO ACTION

If the County is to take No Action and doesn't enact any improvements, then the structures might fail. Therefore, No Action is not a viable alternative.

3.2.2 ALTERNATIVE 2B: OPTIMIZE PERFORMANCE OF EXISTING SYSTEM

The system is currently managed effectively to meet its original basis of design. The alternatives considered will evaluate whether the system shall be rehabilitated or replaced.

3.2.3 ALTERNATIVE 2C: REHABILITATION

Using recent and ongoing gravity main CCTV inspection work in the system, the Augusta Drain District reviewed the data collected and identified sewer segments for rehabilitation projects. All pipes that have been televised and were found to have a NASSCO PACP structural defect score of 4 or 5 were evaluated to prioritize required rehabilitation work and the most cost-effective rehabilitation method.

Manholes and other structures within the Augusta Drain District system have been inspected. This data was reviewed to identify structural assets with NASSCO MACP structural scores of 4 or 5. These structures have also been individually evaluated to prioritize required rehabilitation work and the most cost-effective rehabilitation method. The actual project locations and specific types of interventions for the sewer pipe and manhole structure rehabilitations will be further evaluated and refined during the design phase.

A detailed description of the cost estimate can be found in Appendix B.

- **The Engineer's Opinion of Project Costs for the Drain rehabilitation of the storm sewer pipes and associated manhole structures is approximately $510,000.**

3.2.4 ALTERNATIVE 2D: COMPLETE REPLACEMENT

For comparative purposes a cost estimate was made to replace all of the identified storm sewer pipes and structures in-kind. This alternative would be more disruptive, as most of the rehabilitation proposed as part of Alternative 2C would be "trenchless," or performed with minimal ground-changing activities. Replacement of the storm sewer pipes and structures would require open-cut excavation to replace the assets either in the same

trench or in a parallel trench and then the existing facilities abandoned. A detailed description of the cost estimate can be found in Appendix B.

- **The Engineer's Opinion of Project Costs for the Drain rehabilitation of the storm sewer pipes and associated manhole structures is approximately $920,000.**

3.3 PROJECT 3 – RIPARIAN BUFFER STRIP INSTALLATION

Park upgrades have been deemed necessary within North Kiwanis Park, also known locally as Stanley Park. The area of North Kiwanis Park surrounds Osmun Lake and features a fishing pier as well as playground equipment. In recent years, the City has installed a new park entryway sign, new playground equipment, and new benches and picnic tables. The purpose of the proposed installation of a riparian buffer strip include maintaining a natural vegetative buffer at the edge of Osmun lake to reduce stormwater runoff, as well as the removal of invasive plants from the lake shore.

3.3.1 ALTERNATIVE 3A: NO ACTION

There are various benefits to the installation of a riparian buffer strip including water quality improvement, erosion control, habitat creation, flood mitigation, and establishment of recreational areas.

If No Action is taken, there will be an overall decrease in water quality, erosion reduction, and flood mitigation, leading to a lack of usability of the parks. Therefore, No Action is not a viable option.

3.3.2 ALTERNATIVE 3B: NORTH KIWANIS PARK BUFFER STRIP INSTALLATION

The proposed buffer strip will be located adjacent to Osmun Lake, and will include the following key features:

- A 40-acre lateral drainage area that outlets to Osmun Lake
- The buffer strip is designed to encompass approximately three (3) acres of space
- In general, the buffer strip will be 35 ft wide and can remove up to 15 tons of sediment per acre per year and 100 pounds of nitrogen per acre per year.

The installation of a buffer strip will improve water quality, erosion control, provide habitats for wildlife, flood mitigation, and recreation.

- **The cost of establishing a riparian buffer is approximately $120,000 and approximately $30,000 per year in annual maintenance.**

The cost of regular maintenance will decrease after vegetation in the area is established. This cost estimate includes the following considerations:

- Site preparation, including soil manipulation, grading, removal of invasive species, and installation of erosion and control measures
- Planting, including trees, shrubs, and seeds, as well as labor and maintenance
- Second year reinforcement planting
- Any additional maintenance that may be required in the future

3.4 ALTERNATIVES ANALYSIS

The principal alternatives that will be considered for this analysis are:

- Project 1, Alternative C – Rehabilitation of Drop Fall Structure and Junction Chamber
- Project 1, Alternative D – Replacement of Drop Fall Structure and Junction Chamber
- Project 2, Alternative C – Rehabilitation of Storm Pipe and Structures
- Project 2, Alternative D – Replacement of Storm Pipe and Structures
- Project 3, Alternative B – North Kiwanis Park Buffer Strip Installation

3.5 MONETARY EVALUATION

Preliminary cost estimates have been prepared for each of the alternatives included in the analysis summarized above. Escalation costs were not included in this monetary evaluation. Much of the work will be completed. within the ROW or existing easements. Any new easements that are necessary will be temporary and estimates were included in the cost estimate.

The present worth of the construction cost within the project period of 20 years is determined by using the formula provided below:

$$\text{Present Worth} = \frac{F}{(1+i)^n}$$

where, F – future value/estimated project cost
n – number of years
i – EPA discount rate (0.04)

The OM&R costs throughout the project period of 20 years are determined by using the formula provided below:

$$\text{Present Worth} = A * [\ (1+i)^n - \frac{1}{i(1+i)^n}\ ]$$

where, A – annual expenditure
n – number of years
i – EPA discount rate (0.04)

As indicated by the CWSRF guidance document, the salvage value has been calculated based on in-place construction cost with straight-line depreciation over the estimated design life. For newly constructed pipelines, a design life of 100 years has been estimated based on manufacturer certifications for pipeline performance and testing results. The CWSRF guidance document does not provide information on useful life estimates on rehabilitation methods. Therefore, the estimated design life for the anticipated rehabilitation repairs is predicted based on engineering judgement, past sewer rehabilitation experience, manufacturer test data, and manufacturer's recommended service life. The salvage value for rehabilitation repairs has been calculated based on installation and material cost with straight-line depreciation over the anticipated design life of the various projects and components.

Appendix B details the present worth analysis taking into consideration O&M costs and salvage value, considering the Environmental Protection Agency (EPA) discount rate. The cost estimation also includes the operation, maintenance, and replacement costs for the improvements, covering a period of 20 years. provides a summary of the monetary evaluation for the alternatives. The monetary evaluation and user costs are summarized in Table 3-1.

Table 3-1. Summary of the Monetary Evaluation

	Alternative 1C: Rehabilitate Drop Fall Chamber and Junction Chamber	Alternative 1D: Replace Drop Fall with Precast Screen Wall	Alternative 2C: Rehabilitate Existing Storm Sewers and Structures	Alternative 2D: Replace Existing Storm Sewers and Structures	Alternative 3B: North Kiwanis Park NPS Buffer Strip
Capital Costs	**$290,000**	**$449,000**	**$510,000**	**$920,000**	**$120,000**
Annual OM&R Costs	**$0**	**$0**	**$0**	**$0**	**$30,000**
20 Year Salvage Value	**$0**	**$157,000**	**$0**	**$371,000**	**$0**
Net Present Worth	**$290,000**	**$292,000**	**$510,000**	**$549,000**	**$611,000**
Anuual Equivalent Present Worth	**$18,000**	**$18,000**	**$31,000**	**$34,000**	**$37,000**

Notes:

Net Present Worth is the sum of capital costs, OM&R costs, and interest during construction, less 20 year salvage value.

Present Worth Costs are based on Straight Line Depreciation and no inflation.

EPA Planning Discount rate = 2.0%

ENR CCI = 13175

This Chapter 20 Drain has costs apportioned to the City's General Fund, which is paid by each parcel owner.

	Total Capital & Annual O&M Costs	**Annual Cost:**	**Total Parcels:**
Alts 1C, 2C & 3B:		$950,000	21,476

ESTIMATED MONTHLY USER COST:	**20 Year Loan**
(With no principal forgiveness/grant)	$0.18

Note: the recommended alternatives are shaded in the above table.

3.6 ENVIRONMENTAL EVALUATION

The expected environmental impacts of the proposed alternatives, mainly the impact of the isolated excavations, will be similar in nature. Proper traffic control, soil erosion and sedimentation control, and odor control measures, mitigate impacts to the general public. The costs for increased mitigation measures are minimal in comparison to the major work items involved in each alternative. The social impacts generated by the lengthier construction duration for the replacement alternatives as compared to the rehabilitation alternatives. These social impacts are difficult to measure monetarily but will be considered when choosing the selected alternative should the monetary evaluation be relatively equal.

3.6.1 Conclusions

Based on the above discussion and cost estimates, Alternatives 1C, 2C, and 3B are recommended as the most cost-effective and environmentally-preferred alternatives.

SECTION 4.0 — SELECTED ALTERNATIVES

4.1 PROPOSED FACILITIES AND DESIGN PARAMETERS

The proposed project consists of all improvements described previously under Alternatives 1C, 2C and 3B.

4.2 USEFUL LIFE

$$\textit{Weighted useful life} = \frac{(\text{sum of each asset's dollar value times its estimated useful life})}{\text{Total estimated dollars spent on assets}}$$

The overall effective useful life for each alternative is provided in the cost tables in Appendix B.

4.3 WATER AND ENERGY EFFICIENCY

Ongoing water and energy conservation efforts are also part of WRC's overall Program and any opportunities for increasing conservation were reviewed as part of the alternative. However, there is limited usage of water and energy in the existing collection system and therefore no opportunities for additional efficiency.

4.4 SCHEDULE FOR DESIGN AND CONSTRUCTION

These projects will be coordinated with other District utility projects when applicable. Table 4-1 provides a proposed third quarter loan closing schedule for the projects to be completed in Fiscal Year 2024.

Table 4-1. Proposed Design and Construction Schedule

Engineering Service	FY2024 Q3 Timeframe	
Augusta Drain Drainage Districts Improvements	Design	Feb 2024 – Jun 2024
	Construction Start	Jun 2024
	Construction End	Dec 2024

4.5 COST SUMMARY

The estimated total project cost for the proposed projects is summarized below, and detailed cost estimates for the selected alternatives are presented in Appendix B.

- Alternative 1C: The Engineer's Opinion of Project Cost Estimate for the rehabilitation of the Drop Fall Structure and Junction Chamber is $290,000. The operation, maintenance and replacement costs are similar to the existing conditions and are already included in the annual budget.
- Alternative 2C: The Engineer's opinion of Project Costs for rehabilitation of the Drain's storm sewer pipe and associated structures is $510,000. The operation, maintenance and replacement costs are similar to the existing conditions and are already included in the annual budget.
- Alternative 3B: The Engineer's opinion of Project Costs for constructing a riparian buffer is approximately $120,000. The operation, maintenance and replacement costs are anticipated to be approximately $30,000 per year annually.

The total project cost for the recommended projects is therefore: $920,000 with additional OM&R costs of approximately $30,000 per year.

4.5.1 User Costs and Cost Sharing

The Augusta Drain Drainage District is a Chapter 20 Drain, and the proposed projects for Augusta Drain fit into the Chapter 20 category. The costs as described above will be paid through the assessments. In general, project costs will be assessed based on previously determined apportionment percentages within the appropriate drainage districts. The proposed projects must be presented and approved at a Board of Determination and apportioned entities offered a chance to review their assessments and object, if necessary, at a Public Day of Review. Aggrieved parties have an appeal process as specified in the Drain Code.

The estimated user cost, based on the number of equivalent residences is approximately $0.18 per month per property parcel.

4.6 IMPLEMENTABILITY

The office of the Oakland County Water Resources Commissioner has the legal, financial and institutional authority and resources to successfully implement the recommended projects.

SECTION 5.0 — ENVIRONMENTAL AND PUBLIC HEALTH IMPACTS

5.1 DIRECT IMPACTS

The anticipated environmental impacts resulting from the construction of the selected plan include beneficial and adverse, short term and long term, and irreversible impacts. The following is a discussion of the environmental impacts of the selected plan.

5.1.1 Construction Impacts

Construction activities associated with the proposed improvements will take place on existing facilities. Construction and equipment manufacturing related jobs would be generated, and local contractors would have an equal opportunity to bid on the construction contracts.

The environmental impacts for each alternative are expected to be minimal to none. All elements of improvement efforts in this project aim to have the least impact possible on the community and environment. No long-lasting negative impacts are expected for any alternative. Implementation of the Project Plan would create temporary disruption to nearby residents/businesses and customers due to required construction. This includes noise and dust generated by the work and possible erosion of spoils from open excavation. However, there will be no major disruptions to the service connections. The assessment of alternate solutions and sites for the proposed project included identification of any important resources of either historic or environmental value which are protected by law and should be avoided.

The majority of the project locations are existing facilities within the Right-of-Way so no mature trees are anticipated to be impacted as a result of the construction activities. No registered contamination sites were found within the project area using the EGLE site contamination online mapper tool.

The short-term adverse impacts associated with construction activities would be minimal, and mitigatable, in comparison to the resulting long-term beneficial impacts. Impacts from the proposed improvements include dewatering during replacement of pipes and temporary damage to surface vegetation. Temporary dewatering would slightly lower the groundwater table in the improvement area if required, but there are few to no residential drinking wells in the area. All restoration required post-rehab/replacement should return the impacted area to existing conditions. Short-term impacts for customers and residents include traffic disruption, dust, and noise. No long-term negative impacts are anticipated.

In addition, there are many sewer assets within the Augusta Drain System that require rehabilitation in the immediate future, as described above. Without the construction of the proposed project, the structural integrity of the system may be degraded as the system may not be able to convey the wastewater properly.

The investment in non-recoverable resources committed to the Project Plan would be traded off for the improved performance of the facilities during the life of the system. The commitment of resources includes public capital, energy, labor, and unsalvageable materials. These non-recoverable resources would be foregone for the provision of the proposed improvements. Construction accidents associated with this project may cause irreversible bodily injuries or death. Accidents may also cause damage to or destruction of equipment and other resources.

5.1.2 Operational Impacts

The ongoing function and operation of the Augusta Drain will not be impacted by the proposed projects. All construction projects will be sequenced such that the Drain can continue to function, either by bypass pumping and/or installation of temporary facilities.

5.1.3 Social Impact

The surrounding area will not be impacted other than temporary, short-term impacts associated with construction. After the proposed projects are implemented, the risk of failure of the assets will have been reduced and additional water quality improvements achieved through the riparian buffer strip.

5.2 INDIRECT IMPACTS

Changes in Rate, Density, Or Type of Residential, Commercial, or Industrial Development and the Associated Transportation Changes

No changes are anticipated to the above.

Changes in Land Use

No changes are anticipated to the above. All improvements to the Drainage District will be completed within the existing system footprint.

Changes in Air or Water Quality Due to Facilitated Development

No changes are anticipated to the above.

Resource Consumption Over the Useful Life of the Treatment Works, Especially the Generation of Solid Wastes

No changes are anticipated to the above.

Impacts of Area Aesthetics

All of the proposed work will be completed underground, which is isolated from public view.

5.3 CUMULATIVE IMPACTS

Local Air Quality

There will be minimal direct impacts on local air quality during the construction phases of these projects. Any effects on air quality will be due to dust and emissions from construction equipment and minimal possible styrene emissions from the CIPP curing material.

Archeological, Historical or Cultural Resources

There are no anticipated impacts on archaeological, tribal, historical, or cultural resources due to this Project.

Impacts Upon the Existing or Future Quality of Local Groundwater and Surface Waters

There are no impacts anticipated to the local groundwater, as all construction and improvements will be made within existing facilities.

Impacts Upon Sensitive Features

There are no floodplain or wetland areas within the project footprint as the work is expected to take place within the current locations (existing pipe trench); therefore, all construction will take place outside of the designated floodplain, wetland areas, or other sensitive areas.

Impacts Upon People and The Local Economy

Short-term impacts to people will occur during the construction phase. Minor disruptions to storm sewer service may occur as rehabilitation is completed on the sanitary sewer system. The Augusta Drain Drainage District will experience beneficial long-term impacts due to the level of service to which they expect being maintained by these improvements. The local economy will be stimulated for contractors and suppliers of the materials, labor, and equipment necessary to construct the project.

Operational Impacts

The proposed project will improve the operational efficiency of the storm system and lower future O&M costs for the Drainage District.

Siltation

Siltation may occur during the construction phase of the project. Proper soil erosion and sedimentation control practices will be followed to reduce the impacts of siltation on surrounding areas.

Water Quality Impacts from Direct Discharges and Non-Point Sources

No changes are anticipated to the above, as direct discharges and non-point sources are not a concern within the project limits.

Indirect Impacts from Development

There should not be any development as a result of this project.

The Impacts from Multiple Public Works Projects Occurring in the Same Vicinity

There will only be short-term traffic impacts during the construction phase of this project and proper traffic control measures will be followed.

SECTION 6.0 — MITIGATION

6.1 MITIGATION OF SHORT-TERM IMPACTS

Minimal environmental disruption will occur during construction. Guidelines will be established for cover vegetation removal, dust control, traffic control and accident prevention. Once construction is completed those short-term effects will stop and the area will be returned to the original conditions. The soil erosion impact would be mitigated through the contractor's required compliance with a program for control of soil erosion and sedimentation as specified in Part 91 of Michigan Act 451, P.A. of 1994. The use of soil erosion and sedimentation controls (i.e., straw bales, sedimentation basins, catch basin inserts, silt fencing, etc.) will be properly implemented when necessary.

Careful considerations will be taken during the construction planning process to ensure that the system remains in service while the improvements are underway. Notifications will be provided to residents for them to note that usage during CIPP installation may need to be kept to a minimum for a short period of time in order for proper installation of the new pipe to take place. Since majority of the project locations are within the road, no mature trees are anticipated to be impacted because of the construction activities. Construction equipment will be maintained in good condition to decrease noise. All access roads will be swept as necessary to avoid tracking sediment onto public roads.

6.1.1 Siting Decisions

Alternatives 1C and 2C include rehabilitation that will be implemented at the location of the existing facilities. Alternative 3B, the new riparian buffer strip, was sited in accordance with the City's proposed park master plan.

6.1.2 Operational Impacts

The overall operation of the system will remain the same as the existing if the proposed projects are implemented. For Alternatives 1C and 2C, operation and maintenance needs will be similar to the existing and are already budgeted. There may be additional operation and maintenance required for Alternative 3B, the riparian buffer strip, to maintain the vegetation, which was included in the present worth analysis.

6.2 MITIGATION OF INDIRECT IMPACTS

The current trend in the District is that the land use is mainly dominated by residential properties. According to the District's planning for land use, this will not change. Considering that a vast majority of the residents within the District limits already are connected to the wastewater system, a substantial increase in flow is not expected from within the limits.

6.2.1 Ordinances

All required permits will be applied for during construction of the proposed projects, and local ordinances that impact construction, such as working hours, will be followed. We do not anticipate a need for a variance at this time.

6.2.2 Staging and Construction

Staging Construction

Since the selected Alternatives 1C and 2C include rehabilitation of the existing structures and pipes, staging is only required to ensure continued operation of the facilities. Alternative 3B, the riparian buffer strip, does not require any staging.

Partitioning the Project

No discrete component of this project must be completed prior to completion of the entire project plan to remedy a severe public health, water quality or other environmental problem. Therefore, partitioning of the project is not necessary.

SECTION 7.0 — PUBLIC PARTICIPATION

7.1 PUBLIC MEETING

A Public Meeting is scheduled for April 25th, 2023.

- WRC Office: One Public Works Building #95W, Waterford Twp, MI 48328

7.2 PUBLIC MEETING ADVERTISEMENT

Appendix C includes the following:

- EGLE's signed Project Plan Submittal Form
- The signed Project Useful Life and Cost Analysis Certification Form
- The Project Priority List (PPL) Scoring Data Form

7.3 PUBLIC MEETING SUMMARY

A summary of the public meeting, including any comments or questions from the public, will be provided in the final version of the project plan in Appendix D.

7.4 ADOPTION OF THE PROJECT PLANNING DOCUMENT

A resolution adopting the Project Plan, if approved by the Drain Board, will be provided in the final version of the project plan in Appendix E.

SECTION 8.0 — FISCAL SUSTAINABILITY PLAN

A Fiscal Sustainability Plan (FSP) is available for the facilities that will be replaced or rehabilitated under this project. The signed FSP form can be found in Appendix C.

WRC has an active Asset Management Program ("Program") to support the systems that they operate and/or maintain. The Program was developed with a "Common to All" framework that provides the general data standards, workflows, templates, decision trees, specifications and other elements that will be incorporated into Asset Management Plans ("Plans") for the individual funds. The Plan developed for each fund may include modifications to some of the common Program elements to reflect a given fund's individual infrastructure needs and affordability concerns. This Program will be sustained on an ongoing basis by a team of personnel at WRC, currently designated as the Capital Asset Management and Planning "CAMP" unit, together with other departments and personnel as needed.

The existing asset registry for the system will be updated and modified to reflect add any new assets constructed. Data for any existing facilities and assets impacted by the project will be updated with any new data and rehabilitation dates. At the conclusion of the project, the inventory will be fully updated to accurately reflect the improvements, including condition and performance data. This will provide a benchmark to judge future performance by. Lastly, useful life estimates will be updated for rehabilitated assets and solicited from manufacturers of newly installed assets. These estimates will be used to plan for future operation, maintenance and replacement costs to maintain the required level of service for the system.

Ongoing water and energy conservation efforts are also part of WRC's overall Program and any opportunities for increasing conservation were reviewed as part of the alternative. However, there is limited usage of water and energy in the existing collection system and therefore no opportunities for additional efficiency.

Appendix A — CWSRF Agency Correspondence

HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

555 Hulet Drive
Bloomfield Hills, MI 48302-0360

248-454-6300

www.hrcengr.com

February 13, 2023

Region 1 Planning & Development Commission
Southeast Michigan Council of Governments (SEMCOG)
1001 Woodward Avenue, Suite 1400
Detroit, MI 48226-1927

Re: Regional Environmental Planning Review
Augusta Relief Drain Drainage District Improvement
FY24 CWSRF Project Plan

HRC Job No. 20220896

To Whom it May Concern:

The Oakland County Water Resources Commissioner's Office (WRC) is submitting a Project Plan to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) for acceptance into the Clean Water State Revolving Fund (CWSRF) Loan Program. The Project Plan requires a review to determine any potential impacts on any local development plans, area wide waste treatment management plans and/or regional water quality management plans.

The project construction will involve the following:

- Rehabilitation of the Augusta Drain Drainage District Drop Fall Structure located 250ft Northwest of 404 Lake Laura Dr, Pontiac MI.
- Rehabilitation of the Junction Chamber, located adjacent to the Drop Fall Structure.
- Pipe rehabilitation including spot lining of ten storm pipes and grouting of one storm pipe.
- Structural rehabilitation including replacing three covers, five frames, point grouting seventy-one chimneys, cones, and walls, repairing eight benches, and locating, inspecting, and raising twenty-five manholes.

All population figures and projections referenced in the project plan will be collected from the United States Census Fact Finder Website Profile, which can be found at the following web address: (https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml). We request, on behalf of the WRC, notification if an alternative source for the population data is recommended.

The proposed project site covers mostly urban areas with construction taking place at existing facilities. Excavations will be used throughout the site to help with the rehabilitation of existing facilities. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon local development plans, area wide waste treatment management plans and/or regional water quality management plans. On behalf of the WRC, we are requesting a review to confirm that the above referenced project will not cause an impact to any local development plans, area wide waste treatment management plans and/or regional water quality management plans.

We request, on behalf of the WRC, your concurrence with this determination. We appreciate your review and would be grateful for a response by February 24th,2023, so that we may meet program deadlines.

Additionally, a copy of the Project Plan Draft will be sent to your office upon completion for your review and approval.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Marisa J. Lavins
Graduate Engineer I

Attachment
Project Location Map

pc: HRC; F. Babakhani, File

HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

555 Hulet Drive
Bloomfield Hills, MI 48302-0360

248-454-6300

www.hrcengr.com

February 14, 2023

EGLE Water Resources Division
Warren District Office
27700 Donald Court
Warren, MI 48092-2793

Re: Land-Water Interfaces Review
August Relief Drain Drainage District Improvement
FY24 CWSRF Project Plan

HRC Job No. 20220896

To Whom it May Concern:

The Oakland County Water Resources Commissioner's Office (WRC) is submitting a Project Plan to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) for acceptance into the Clean Water State Revolving Fund (CWSRF) Loan Program. The Project Plan requires a review to determine any potential impacts on land-water interfaces, including Inland Lakes and Streams, Floodplains, Wetlands, Great Lakes Shorelands, Navigable Waters and Army Corps of Engineers (ACE) Regulated Activities.

On behalf of the WRC, we are requesting information regarding the impacts of the above referenced proposed project upon the previously detailed land-water interfaces in the vicinity of the project. The project construction will involve the following:

- Rehabilitation of the Augusta Drain Drainage District Drop Fall Structure located 250ft Northwest of 404 Lake Laura Dr, Pontiac MI.
- Rehabilitation of the Junction Chamber, located adjacent to the Drop Fall Structure.
- Pipe rehabilitation including spot lining of ten storm pipes and grouting of one storm pipe.
- Structural rehabilitation including replacing three covers, five frames, point grouting seventy-one chimneys, cones, and walls, repairing eight benches, and locating, inspecting, and raising twenty-five manholes.

The proposed project site covers mostly urban areas with construction taking place at existing facilities. Excavations will be used throughout the site to help with the rehabilitation of existing facilities. In conclusion, there will not be any construction that will impact inland lakes or streams. On behalf of the WRC, we are requesting a review to confirm that the above referenced project will not cause an impact to any Inland Lakes and Streams, regulatory floodplain limits, or any existing wetlands. However, if project work is required within an existing wetland, necessary mitigation measures will be undertaken to protect the wetlands influenced by the project.

Since the proposed project does not involve improvements to existing facilities that are located along a shoreline or within navigable waters of the United States, no impacts are expected from the proposed project upon Great Lakes Shorelands, Navigable Waters or ACE Regulated Activities. On behalf of the WRC, we are requesting a review to confirm that the above referenced project will not cause an impact to any Great Lakes Shorelands, Navigable Waters or ACE Regulated Activities.

If not already obtained, the appropriate joint permit applications will be completed, and the necessary permits obtained prior to any construction activities in this project area.

We request, on behalf of the WRC, your concurrence with this determination. We appreciate your review and would be grateful for a response by February 24th, 2023, so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

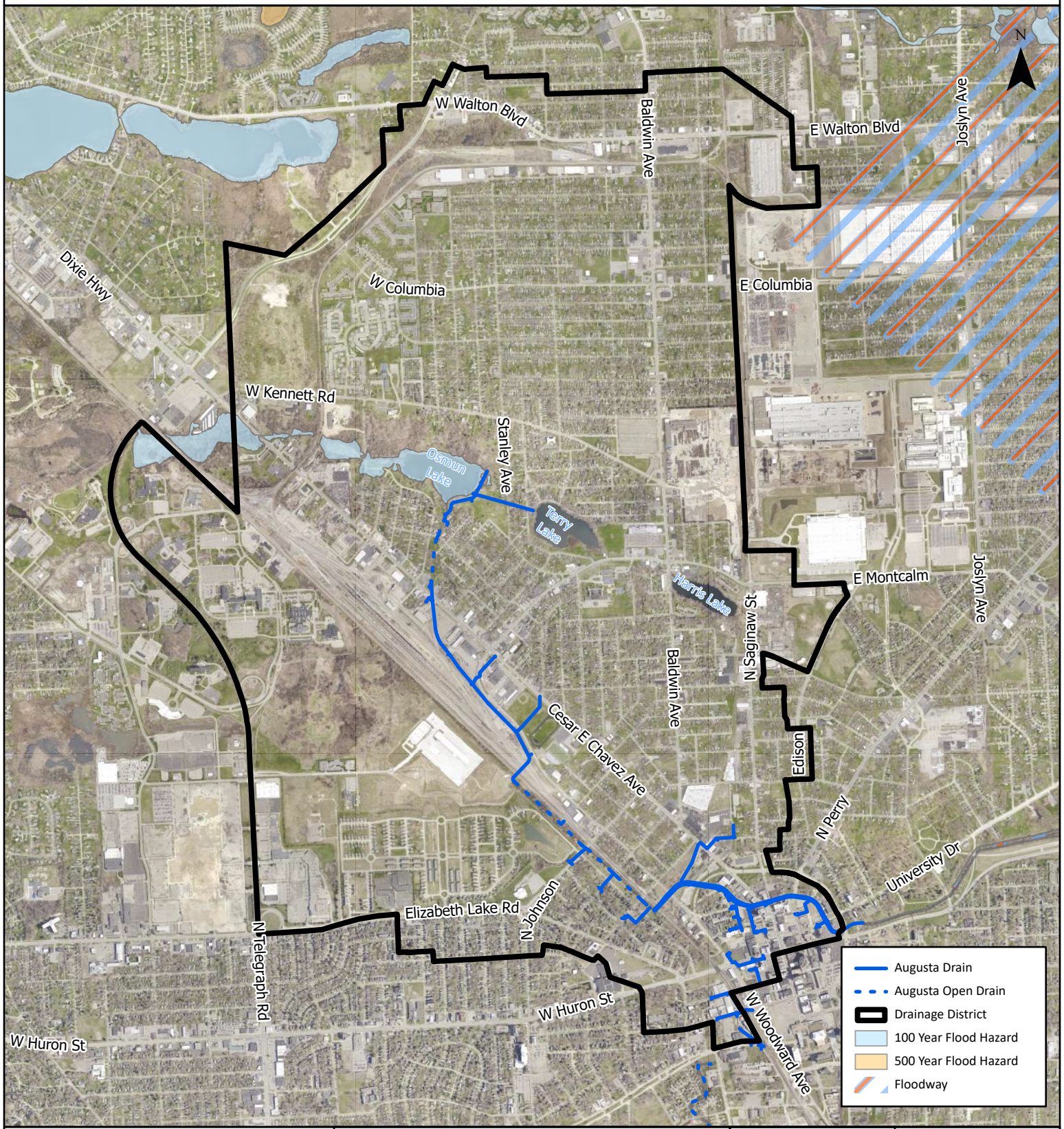
HUBBELL, ROTH & CLARK, INC.

Marisa J. Lavins
Graduate Engineer I

Attachments
FEMA Overview Map
Wetlands Overview Map
Project Rehabilitation Locations

pc: HRC; F. Babakhani, File

Augusta Drain Drainage District Improvements



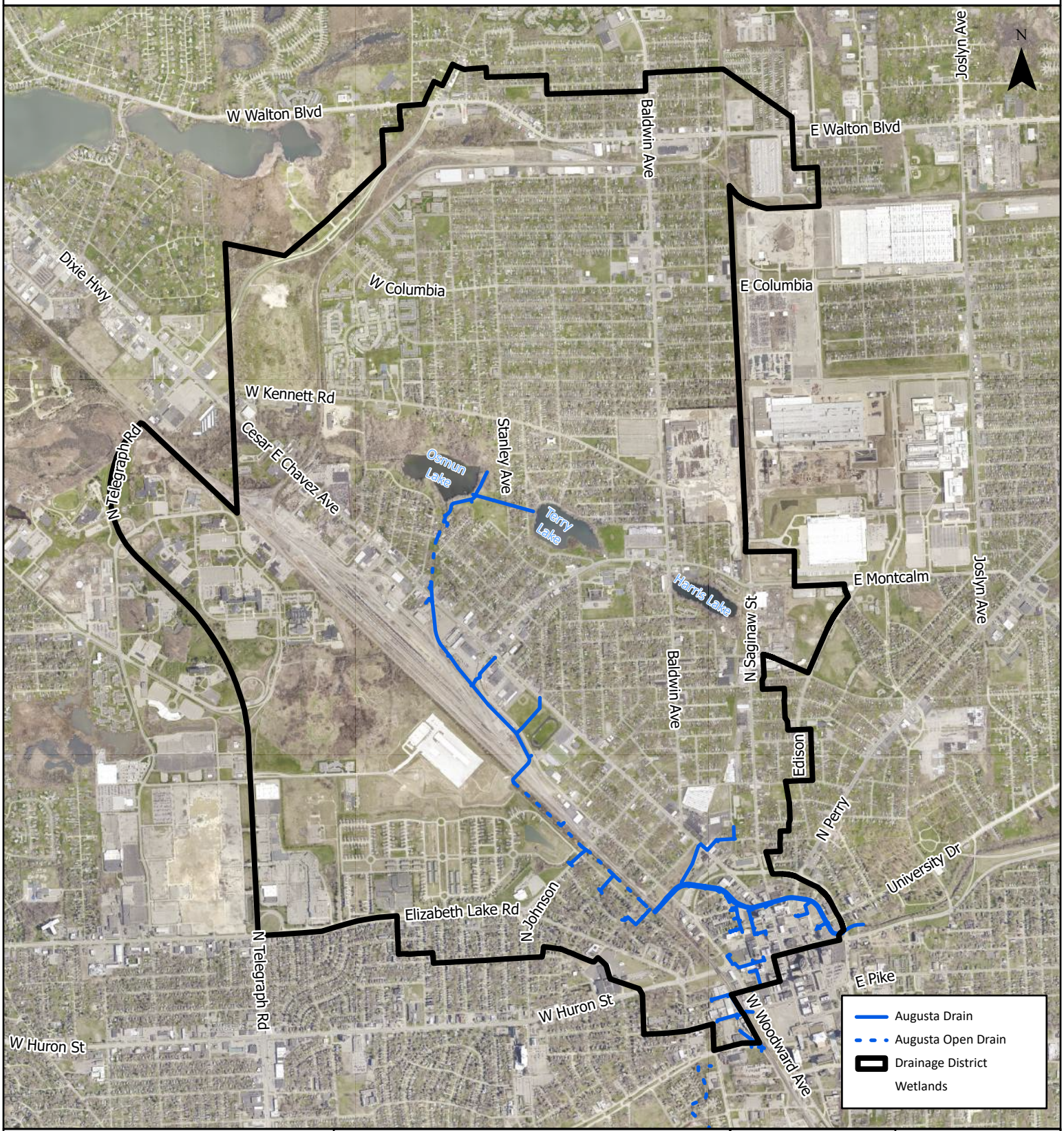
WRC
WATER RESOURCES COMMISSIONER
Jim Nash

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

555 Hulet Drive
P.O. Box 824
Bloomfield Hills, MI 48303-0824
(248) 454-6300
https://www.hrcengr.com

Date:	HRC Job #:
1/26/2023	20220896
Sheet: FEMA Overview	Scale: 0 500 1,000 2,000 Feet

Augusta Drain Drainage District Improvements



WRC
WATER RESOURCES COMMISSIONER
Jim Nash

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

555 Hulet Drive
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Bloomfield Hills, MI 48303-0824
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https://www.hrcengr.com

Date:	HRC Job #:
1/26/2023	20220896
Sheet: Wetlands Overview	Scale: 0 500 1,000 2,000 Feet

Augusta Drainage District Improvements

HRC Job # 20220896

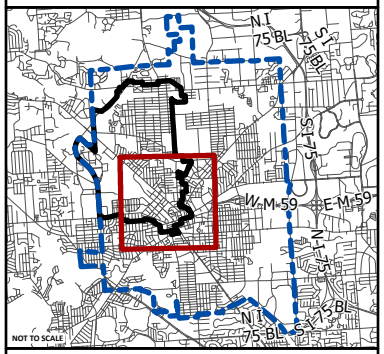
Legend

- Drop Fall Structure and Junction Chamber Repair
- Manhole Repair Locations
- Storm Pipe Repair Locations
- Storm Manhole
- Storm Inlet
- Augusta Open Drain
- Augusta Drain
- Tax Parcels

N W E S

0 500 1,000 Feet

City of Pontiac
Augusta Drain



HRC HUBBELL, ROTH & CLARK, INC CONSULTING ENGINEERS SINCE 1915

WRC WATER RESOURCES COMMISSIONER Jim Nash

DISCLAIMER:

The information displayed in this map is compiled from recorded deeds, plats, tax maps, surveys and other public records. Although this information is intended to accurately reflect public information, it is not a legally recorded map or survey and is not intended to be used as one. User should consult primary/ordinal information sources where appropriate.

Path: Y:\2022\08\20220896\03 Studies\Working\GIS\AugustaDrain.aprx

Appendix B — CWSRF Cost Analysis

AUGUSTA DRAIN DRAINAGE DISTRCT CWSRF

SUMMARY OF MONETARY EVAULATION

	Alternative 1C: Rehabilitate Drop Fall Chamber and Junction Chamber	Alternative 1D: Replace Drop Fall with Precast Screen Wall	Alternative 2C: Rehabilitate Existing Storm Sewers and Structures	Alternative 2D: Replace Existing Storm Sewers and Structures	Alternative 3B: North Kiwanis Park NPS Buffer Strip
Capital Costs	**$290,000**	**$449,000**	**$510,000**	**$920,000**	**$120,000**
Annual OM&R Costs	**$0**	**$0**	**$0**	**$0**	**$30,000**
20 Year Salvage Value	**$0**	**$157,000**	**$0**	**$371,000**	**$0**
Net Present Worth	**$290,000**	**$292,000**	**$510,000**	**$549,000**	**$611,000**
Anuual Equivalent Present Worth	**$18,000**	**$18,000**	**$31,000**	**$34,000**	**$37,000**

Notes:

Net Present Worth is the sum of capital costs, OM&R costs, and interest during construction, less 20 year salvage value.

Present Worth Costs are based on Straight Line Depreciation and no inflation.

EPA Planning Discount rate = 2.0%

ENR CCI = 13175

This Chapter 20 Drain has costs apportioned to the City's General Fund, which is paid by each parcel owner.

	Annual Cost:	**Total Parcels:**
Total Capital & Annual O&M Costs Alts 1C, 2C & 3B:	$950,000	21,476

	20 Year Loan
ESTIMATED MONTHLY USER COST: (With no principal forgiveness/grant)	$0.18

ENGINEER'S OPINION OF PROBABLE PROJECT COST

Bloomfield Hills, MI — Telephone: (248) 454-6300

PROJECT: **Alternative 1C: Rehabilitate Drop Fall Chamber and Junction Chamber** — DATE: **4/6/2023**

LOCATION: **Augusta Drop Fall Structure, NW of 404 Lake Laura Dr., Pontiac** — PROJECT NO. **20220981**

BASIS FOR ESTIMATE: [x] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL — ESTIMATOR: **SLD**

WORK: **Rehabilitate Sheet Pile Wall and New Wales, Struts and Screen** — CHECKED BY: **DWM**

Junction Chamber Rehabilitation and Repairs — CURRENT ENR: **13175**

USEFUL LIFE	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
20	Structural Steel, Rolled Shape, Erect	4,680	LB	$ 5	$23,400
20	Structural Steel, Rolled Shape, Furn and Fab	4,680	LB	$ 5	$21,060
20	Precast Beams (8" x 8")	180	FT	$ 150	$27,000
20	Demo - Drop Structure	1	LS	$ 18,000	$18,000
20	Steel Sheet Piling, Temp	480	SF	$ 30	$14,400
20	Steel Sheet Piling, Permanent	600	SF	$ 40	$24,000
20	Dewatering System	1	LS	$ 25,000	$25,000
20	Rehabilitate Junction Chamber	1	LS	$ 40,000	$40,000
	Unit Cost Subtotal				***$193,000***
	Contractor General Conditions, Overhead and Permits	10	*%*		*$19,300*
	Contingencies	10	*%*		*$19,300*
	Construction Subtotal				***$231,600***
	Engineering, Legal, and Administration	25	*%*		*$57,900*
	TOTAL PROJECT COST				***$290,000***

Alternative 1C: Rehabilitate Drop Fall Chamber and Junction Chamber

PRESENT WORTH ANALYSIS

CAPITAL COST		FIRST COST[1]	SERVICE LIFE (YEARS)		PRESENT WORTH[2]
Rehabilitate Drop Fall Chamber	$	230,000	20	$	230,000
Rehabilitate Junction Chamber		60,000	20		60,000
TOTAL CAPITAL COST	**$**	**290,000**	20	$	290,000
PW OF SALVAGE VALUE ***(FIRST COST - PRESENT WORTH)***	$	0			
ANNUAL OPERATION AND MAINTENANCE COST					
TOTAL ANNUAL O&M COST[3]			$ 0		
PRESENT WORTH OF O&M COST				$	0
NET PRESENT WORTH				**$**	**290,000**
AVERAGE ANNUAL EQUIVALENT COST OF PRESENT WORTH				**$**	**18,000**

Notes:

(1) January 2023 ENR 20 Cities CCI = 13175

(2) Cost is based on a study period of 20 years and a discount rate of 2.0%
Present Worth Costs are based on Straight Line Depreciation and no inflation.
https://www.whitehouse.gov/omb/information-for-agencies/circulars/

(3) The anticipated O&M is similar for both alternatives and to the existing budgeted OM&R costs, and therefore is not included in this analysis.

ENGINEER'S OPINION OF PROBABLE PROJECT COST

Bloomfield Hills, MI — Telephone: (248) 454-6300

PROJECT:	**Alternative 1D: Replace Drop Fall with Precast Screen Wall**	DATE:	**4/6/2023**
LOCATION:	**Augusta Drop Fall Structure, NW of 404 Lake Laura Dr., Pontiac**	PROJECT NO.	**20220981**
BASIS FOR ESTIMATE:	[x] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	**SLD**
WORK:	**Demo Existing & Install Precast Screen Vault w/in Exist Sheet Pile Walls**	CHECKED BY:	**DWM**
	Junction Chamber Rehabilitation and Repairs	CURRENT ENR:	**13175**

USEFUL LIFE	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
50	Precast Conc Culvert	1	EA	$ 180,000	$180,000
50	Backfill, Structure, CIP	30	CY	$ 40	$1,200
50	Demo - Drop Structure	1	LS	$ 18,000	$18,000
50	Dewatering System (longer duration than Alt 1C)	1	LS	$ 60,000	$60,000
20	Rehabilitate Junction Chamber	1	LS	$ 40,000	$40,000
	Unit Cost Subtotal				***$299,000***
	Contractor General Conditions, Overhead and Permits	10	*%*		*$29,900*
	Contingencies	10	*%*		*$29,900*
	Construction Subtotal				***$358,800***
	Engineering, Legal, and Administration	25	*%*		*$89,700*
	TOTAL PROJECT COST				***$449,000***

Alternative 1D: Replace Drop Fall with Precast Screen Wall

PRESENT WORTH ANALYSIS

CAPITAL COST		FIRST COST[1]	SERVICE LIFE (YEARS)		PRESENT WORTH[2]
New Precast Screen Structure	$	389,000	50	$	232,000
Rehabilitate Junction Chamber		60,000	20		60,000
TOTAL CAPITAL COST	**$**	**449,000**		$	292,000
PW OF SALVAGE VALUE ***(FIRST COST - PRESENT WORTH)***	$	157,000			
ANNUAL OPERATION AND MAINTENANCE COST					
TOTAL ANNUAL O&M COST[3]			$ 0		
PRESENT WORTH OF O&M COST				$	0
NET PRESENT WORTH				**$**	**292,000**
AVERAGE ANNUAL EQUIVALENT COST OF PRESENT WORTH				**$**	**18,000**

Notes:

(1) January 2023 ENR 20 Cities CCI = 13175

(2) Cost is based on a study period of 20 years and a discount rate of 2.0%
Present Worth Costs are based on Straight Line Depreciation and no inflation.
https://www.whitehouse.gov/omb/information-for-agencies/circulars/

(3) The anticipated O&M is similar for both alternatives and to the existing budgeted OM&R costs, and therefore is not included in this analysis.

ENGINEER'S OPINION OF PROBABLE PROJECT COST

Bloomfield Hills, MI — Telephone: (248) 454-6300

PROJECT: **Alternative 2C: Rehabilitate Existing Storm Sewers and Structures** — DATE: **4/6/2023**

LOCATION: **Augusta Drain Storm Sewer System** — PROJECT NO. **20220981**

BASIS FOR ESTIMATE: [x] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL — ESTIMATOR: **SLD**

WORK: **Rehabilitate Existing Storm Sewers and Associated Structures** — CHECKED BY: **DWM**

CURRENT ENR: **13175**

USEFUL LIFE	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
20	Spot Repairs and Grouting of Storm Pipe, 10" to 15" Dia.	16	EA	$ 7,500	$120,000
20	Spot Repairs and Grouting of Storm Pipe, 24" Dia.	1	EA	$ 8,000	$8,000
20	Spot Repairs and Grouting of Storm Pipe, 36" Dia.	1	EA	$ 10,000	$10,000
20	Spot Repairs and Grouting of Storm Pipe, 42" Dia.	1	EA	$ 13,000	$13,000
20	Spot Repairs and Rehab of Manholes	51	EA	$ 3,700	$188,700
	Unit Cost Subtotal				***$339,700***
	Contractor General Conditions, Overhead and Permits	10	*%*		*$33,970*
	Contingencies	10	*%*		*$33,970*
	Construction Subtotal				***$407,640***
	Engineering, Legal, and Administration	25	*%*		*$101,910*
	TOTAL PROJECT COST				***$510,000***

Alternative 2C: Rehabilitate Existing Storm Sewers and Structures

PRESENT WORTH ANALYSIS

CAPITAL COST		FIRST COST[1]	SERVICE LIFE (YEARS)		PRESENT WORTH[2]
Rehabilitate Existing Pipes	$	227,000	20	$	227,000
Rehabilitate Existing Structures		283,000	20		283,000
TOTAL CAPITAL COST	**$**	**510,000**	20	$	510,000
PW OF SALVAGE VALUE ***(FIRST COST - PRESENT WORTH)***	$	0			
ANNUAL OPERATION AND MAINTENANCE COST					
TOTAL ANNUAL O&M COST[3]			$ 0		
PRESENT WORTH OF O&M COST				$	0
NET PRESENT WORTH				**$**	**510,000**
AVERAGE ANNUAL EQUIVALENT COST OF PRESENT WORTH				**$**	**31,000**

Notes:

(1) January 2023 ENR 20 Cities CCI = 13175

(2) Cost is based on a study period of 20 years and a discount rate of 2.0%
Present Worth Costs are based on Straight Line Depreciation and no inflation.
https://www.whitehouse.gov/omb/information-for-agencies/circulars/

(3) The anticipated O&M is similar for both alternatives and to the existing budgeted OM&R costs, and therefore is not included in this analysis.

ENGINEER'S OPINION OF PROBABLE PROJECT COST

Bloomfield Hills, MI — Telephone: (248) 454-6300

PROJECT: **Alternative 2D: Replace Existing Storm Sewers and Structures** — DATE: **4/6/2023**

LOCATION: **Augusta Drain Storm Sewer System** — PROJECT NO. **20220981**

BASIS FOR ESTIMATE: [x] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL — ESTIMATOR: **SLD**

WORK: **Replace Existing Storm Sewers and Manhole Structures** — CHECKED BY: **DWM**

CURRENT ENR: **13175**

USEFUL LIFE	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
20	New Storm Pipe, 10" to 15" Dia.	718	LFT	$ 350	$251,000
20	New Storm Pipe, 24" Dia.	69	LFT	$ 550	$38,000
20	New Storm Pipe, 36" Dia.	446	LFT	$ 700	$312,000
20	New Storm Pipe, 42" Dia.	371	LFT	$ 800	$297,000
20	Replace Manholes	51	EA	$ 8,000	$408,000
	Unit Cost Subtotal				***$1,306,000***
	Contractor General Conditions, Overhead and Permits	10	*%*		*$130,600*
	Contingencies	10	*%*		*$130,600*
	Construction Subtotal				***$1,567,200***
	Engineering, Legal, and Administration	25	*%*		*$391,800*
	TOTAL PROJECT COST				***$2,000,000***

Alternative 2D: Replace Existing Storm Sewers and Structures

PRESENT WORTH ANALYSIS

CAPITAL COST		FIRST COST[1]	SERVICE LIFE (YEARS)		PRESENT WORTH[2]
Replace Existing Pipes	$	536,000	50	$	320,000
Replace Existing Structures		384,000	50		229,000
TOTAL CAPITAL COST	**$**	**920,000**		$	549,000
PW OF SALVAGE VALUE ***(FIRST COST - PRESENT WORTH)***	$	371,000			
ANNUAL OPERATION AND MAINTENANCE COST					
TOTAL ANNUAL O&M COST[3]			$ 0		
PRESENT WORTH OF O&M COST				$	0
NET PRESENT WORTH				**$**	**549,000**
AVERAGE ANNUAL EQUIVALENT COST OF PRESENT WORTH				**$**	**34,000**

Notes:

(1) January 2023 ENR 20 Cities CCI = 13175

(2) Cost is based on a study period of 20 years and a discount rate of 2.0%
Present Worth Costs are based on Straight Line Depreciation and no inflation.
https://www.whitehouse.gov/omb/information-for-agencies/circulars/

(3) The anticipated O&M is similar for both alternatives and to the existing budgeted OM&R costs, and therefore is not included in this analysis.

ENGINEER'S OPINION OF PROBABLE PROJECT COST

Bloomfield Hills, MI — Telephone: (248) 454-6300

PROJECT: **Alternative 3B: North Kiwanis Park NPS Buffer Strip** — DATE: **4/6/2023**

LOCATION: **Adjacent ot Osmun Lake in Pontiac** — PROJECT NO. **20220981**

BASIS FOR ESTIMATE: [x] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL — ESTIMATOR: **SLD**

WORK: **New NPS Buffer Strip to Enhance Park and Meet TMDLs** — CHECKED BY: **DWM**

CURRENT ENR: **13175**

USEFUL LIFE	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
20	Installation of New Buffer Strip at Osmun Lake in Park	35	FT	$ 2,280	$79,800
	Unit Cost Subtotal				***$79,800***
	Contractor General Conditions, Overhead and Permits	10	*%*		*$7,980*
	Contingencies	10	*%*		*$7,980*
	Construction Subtotal				***$95,760***
	Engineering, Legal, and Administration	25	*%*		*$23,940*
	TOTAL PROJECT COST				***$120,000***

Alternative 3B: North Kiwanis Park NPS Buffer Strip

PRESENT WORTH ANALYSIS

CAPITAL COST		FIRST COST[1]	SERVICE LIFE (YEARS)		PRESENT WORTH[2]
New Buffer Strip at Osmun Lake	$	120,000	20	$	120,000
TOTAL CAPITAL COST	**$**	**120,000**	20	$	120,000
PW OF SALVAGE VALUE ***(FIRST COST - PRESENT WORTH)***	$	0			
ANNUAL OPERATION AND MAINTENANCE COST					
TOTAL ANNUAL O&M COST			$ 30,000		
PRESENT WORTH OF O&M COST				$	491,000
NET PRESENT WORTH				**$**	**611,000**
AVERAGE ANNUAL EQUIVALENT COST OF PRESENT WORTH				**$**	**37,000**

Notes:

(1) January 2023 ENR 20 Cities CCI = 13175

(2) Cost is based on a study period of 20 years and a discount rate of 2.0%
Present Worth Costs are based on Straight Line Depreciation and no inflation.
https://www.whitehouse.gov/omb/information-for-agencies/circulars/

Appendix C — EGLE Submittable Forms

SRF/SWQIF Project Nos. _____

Project Priority List (PPL) Scoring Data Form

Please complete the information requested below and indicate the page numbers or appendices in the project plan which verify the information provided. Enter "N/A" if information is not pertinent.

PROJECT APPLICANT: **Augusta Drain Drainage District**

PROJECT LOCATION: **Augusta Drain Drainage District**

1. Water Pollution Severity Data (0 to 500 points)

page _____ **1. Pre-project conditions, including wastewater collection/treatment deficiencies and water quality problems currently occurring.**

page _____ **2. Post-project conditions, including proposed facilities and water quality improvements.**

Does the existing facility (or facilities) being upgraded, expanded, or replaced by this project file either surface water or groundwater discharge monitoring reports?

☒ **YES, Proceed to Section C** **or** ☐ **NO, Proceed to Section A or B**

Note: If a project with either a surface water or groundwater discharge is also causing a nitrate problem in the groundwater (i.e., leaky lagoons), please be sure to complete Item B.5. Projects may receive points for both surface water and groundwater contamination.

A. Data on Existing Surface Water Discharge

page _____ **1. Discharge type:**

☒ Continuous

☐ Seasonal

☐ Intermittent (***if CSO, or SSO, please complete Sections E and F below***)

page **2-6** _____ **2. Flow**. For facilities that discharge to regional treatment plants and do not file surface water discharge monitoring reports, provide the average daily metered flow *(identify whether units are MGD or MGY*) **1.2 MGD**

page _____ **3. Identify Receiving Water and Type** _____

page _____ **4. Location** (*town, range, and section*) _____

page **2-3** _____ **5. Existing Treatment**

☐ Untreated ☒ Secondary ☐ Combined Sewer Overflow ☐ Tertiary

☒ Primary (including septic systems with direct surface water discharge)

page **2-6** _____ **6. Existing Disinfection Process:**

☐ None

☒ Chlorination

☐ Alternative Technology (*specify type*) _____

B. Data on Existing Groundwater Discharge

page _____ **1. Discharge Type:**

☐ Continuous

☐ Seasonal

☐ Intermittent

page

2. **Flow.** For unsewered areas, flow should be calculated using a figure of 70 gpcd. For facilities that do not file groundwater discharge monitoring reports, provide the existing metered flow figure *(identify whether units are MGD or MGY*)

page

3. **Location** (*provide town, range, and section*)

page

4. **Existing Treatment**

☐ Untreated ☐ Primary (including septic with tile field) ☐ Secondary

page

5. **Nitrate contamination of public or private wells caused by the discharge of effluent/waste from the treatment system or systems**

☐ Public well(s) in vicinity contains nitrates > 10 mg/L (100 points)

☐ Private well(s) in vicinity contains nitrates > 10 mg/L (75 points)

☐ Monitoring well(s) in vicinity contains nitrates > 10 mg/L (50 points)*

☐ No evidence of nitrate contamination in local wells

*Note: If only the total inorganic nitrogen ("TIN" ammonia + nitrite + nitrate) concentration is available, a separate sampling and nitrate analysis should be performed to document the nitrate concentration.

C. Information on Proposed Surface Water/Groundwater Discharge

(Attach additional pages if necessary; a copy of the effluent limits letter/permit table may suffice.)

page

1. **Discharge Type:**

☒ Continuous

☐ Seasonal Identify all discharge points and receiving waters.

☐ Intermittent

page **2-6**

2. **Average Design Flow** *(identify units as MGD or MGY*) **1.2 MGD**

page

3. **Identify receiving water for a surface water discharge**

page

4. **Location** (*town, range, and section*)

5. **List Effluent Limits:**

Minimum Dissolved Oxygen

$CBOD_5$

Ammonia

Phosphorus

Total Inorganic Nitrogen (TIN)
(from Groundwater Permit)

page

6. **Will the proposed facility address <u>documented</u> total residual chlorine (TRC) violations?**

☒ YES, proceed to 7 ☐ NO

7. **Will the proposed disinfection improvements involve either dechlorination or an alternative disinfection technology (e.g. ultraviolet disinfection, ozonation) that eliminates the use of chlorine?**

☒ YES ☐ NO

D. Data on Existing (Pre-Project) CSO and SSO Discharges

*Information must be provided **for each outfall** directly associated with the proposed correction project.*

Outfall #	Receiving Stream	Location* Town/Range/Section	Estimated Overflow Volume (MG) for 1-year, 1-hour storm event
001	Cass River	Section 12, T09E, R03N	0

Outfall #	Estimated Overflow Duration (Hours)	Estimated Annual Overflow Volume (MG)	Tributary Residential Population
001	0	0	N/A

* A map showing the discharge locations by number is highly preferable and can be attached to this sheet.

E. Data on Future (Post-Project) CSO and SSO Discharges

List each outfall from Section E. For outfalls which will cease to function as combined sewer outfalls upon the completion of this project, simply enter "Eliminated" under Receiving Stream*. List any new outfalls (e.g., for a retention/treatment basin) created by this project and include its associated discharge data.*

Outfall #	Receiving Stream	Location* Town/Range/Section	Estimated Overflow Volume (MG) for 1-year, 1-hour storm event
001	Cass River	Section 12, T09E, R03N	0

Outfall #	Estimated Overflow Duration (Hours)	Estimated Annual Overflow Volume (MG)	Detention Time Prior to Discharge for 1-year, 1-hour storm event
001	0	0	N/A

* A map showing the discharge locations by number is highly preferable and can be attached to this sheet.

Please attach additional pages if necessary.

2. Enforcement Actions (0 or 300 points)

Is the proposed project necessary for compliance with a fixed-date construction schedule established by an order, permit, or other document issued by the DEQ, or entered as part of an action brought by the state against a municipality?

☐ **YES, Proceed to Item A** **or** ☒ **NO, Proceed to Section 3**

page _____ **A. Copy of the enforcement action, order, permit or other DEQ document.**

3. Population Data (30 to 100 points)

page **2-3** **A. Existing residential population to be served by the proposed project:** _____

page **2-3** **B. Existing population of the POTW service area:** _____

4. Dilution Ratio (25 to 100 points)

The data for the dilution ratio scoring category is collected from several questions in the Water Quality Severity Data section of this document and information in DEQ files, therefore, ***no action is required from the applicant for the completion of this item of the PPL Scoring Data Form****. The primary purpose of this section is to clarify and document the figures utilized in the dilution ratio calculation. Please note that for new collection system projects, the existing discharge is calculated by multiplying the residential population to be served by the proposed project by 70 gallons per capita per day (gpcd). For projects with existing Groundwater and NPDES permits, the Discharge Monitoring Report (DMR) data will be obtained by the DEQ staff. For projects that discharge to regional facilities and do not have individual discharge permits, the existing discharge will be based on the average daily metered flow.*

The following information will be completed by DEQ staff:

The dilution ratio is _____ and was calculated from _____/_____.

(Specify the units for both the numerator and denominator).

5. Failing On-Site Septic Systems (0 or 100 points)

Does the project propose to correct failing on-site septic systems that have no suitable replacement?

☒ **YES, Proceed to Item A** **or** ☐ **NO, Proceed to Section 6**

page **2-7** **A. Documentation of site limitations that prevent septic system replacement.**

6. Septage Receiving/Treatment Facilities (0 or 100 points)

Does the project propose to construct, upgrade, or expand a septage receiving or treatment facility?

☒ **YES, Proceed to Item A** **or** ☐ **NO**

page **2-7** **A. Description of the proposed septage facility improvements.**

Fiscal Sustainability Plan Certification Form

Describe SRF Project to be Funded: OR SRF Project Number _____

Augusta Drain Drainage District Improvements

Check one box below:

☐ FSP does not apply because:

- ☐ The project is for a new treatment works system.
- ☐ The project involves an upgrade that does not involve repair/replacement or expansion of a treatment works system.
- ☐ The project is for nonpoint source work.
- ☐ Other (explain)

☒ FSP is complete for the SRF-funded project and is available for review by contacting:

Sally Duffy 734-776-7336

(Name) (Phone)

I certify that the Augusta DDD has developed and implemented a plan that meets (Applicant's Name)
the requirements of Section 603(d)(1)(E)(i) of the Water Resources Reform and Development Act of 2014. The FSP includes an inventory of critical assets, an evaluation of the condition and performance of inventoried assets, a plan for maintaining, repairing, and as necessary, replacing the treatment works, and a plan for funding such activities. The applicant also certifies that the water and energy conservation efforts have been evaluated and will be implemented.

Name and Title of Authorized Representative *(Please Print or Type)*

Signature of Authorized Representative Date

Project Useful Life and Cost Analysis Certification Form

Project Information

Applicant Name: Augusta Drain Drainage District

SRF Project to be Funded: CWSRF Stormwater Project Plan for the Augusta Drain Drainage District Improvements

Per Section 602(b)(13) of the Federal Water Pollution Control Act (FWPCA), all Clean Water State Revolving Fund (CWSRF) assistance recipients must certify that they have conducted the studies and evaluations described in 602(b)(13)(A) and (B), collectively known as a cost and effectiveness analysis.

☒ 1) The applicant has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is sought under the CWSRF; and

☒ 2) The applicant has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of:
- constructing the project or activity;
- operating and maintaining the project or activity over the life of the project; and
- replacing the project or activity.

☒ 3) The applicant has completed a Project Useful Life analysis for the project or activity. **Attach appropriate documentation**

I certify that requirements (1), (2), and (3) as checked above have been met.

Sally Duffy

Name of Professional Engineer *(Please Print or Type)*

Signature of Professional Engineer Date

Name and Title of Authorized Representative *(Please Print or Type)*

Signature of Authorized Representative Date

Appendix D — Project Planning Public Meeting

(to be provided in final version)

NOTICE OF PROJECT PLANNING PUBLIC MEETING

The **Augusta Drain Drainage District** will hold a public meeting on the proposed **Clean Water State Revolving Fund (CWSRF) Storm System Improvements** project for the purpose of receiving comments from interested persons.

The meeting will be held at **2:00 p.m.** on **Tuesday, April 25, 2023, virtually and at the Oakland County Water Resources Commissioner's Office (1 Public Works Dr., Waterford, MI.)**

The purpose of the proposed project is **to make improvements to the existing storm water systems in order to continue to meet the required level of service for the systems.**

Project construction will involve **upgrades to and rehabilitation of existing stormwater pipes and structures.**

Impacts of the proposed project include **temporary noise and disruption to the public due to construction of the required improvements, which will be offset by improvements that will reduce the likelihood of system failures.**

The estimated cost to users for the proposed project is approximately **$0.18 per household over 20 years. However, the Drain will likely qualify as "overburdened" and may be eligible for additional grant funding and/or principal forgiveness, which would reduce the cost. The Drain will also have the opportunity to reduce the scope of work and potential cost during the design phase and/or defer the project should funding not be awarded.**

Copies of the plan detailing the proposed project are available for inspection at the following location: **Oakland County Water Resources Commissioner's Office (1 Public Works Dr., Waterford, MI.)**

Written comments received before the meeting record is closed on **Tuesday, April 25, 2023,** will receive responses in the final project planning document. Written comments should be sent to Stephanie Lajdziak at lajdziaks@oakgov.com before TUESDAY, APRIL 25, 2022 at 2:00 P.M.

Appendix E — Resolution and Project Plan Submittal Form

(to be provided in final version)

A RESOLUTION ADOPTING THE
AUGUSTA DRAIN DRAINAGE DISTRICT'S
2024 CLEAN WATER STATE REVOLVING FUND PROJECT PLAN AND
DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE

WHEREAS, the Drainage Board for the Augusta Drain Drainage District recognizes the need to make improvements to its existing storm sewer system; and

WHEREAS, the Drainage Board for the Augusta Drain Drainage District authorized Hubbell, Roth & Clark, Inc. to prepare a Clean Water State Revolving Fund Project Plan, which recommends the construction of various improvements to the system; and

WHEREAS, said Project Plan was presented at a Public Hearing held at the offices of the Oakland County Water Resources Commissioner held on April 25, 2023;

NOW THEREFORE BE IT RESOLVED, that the Drainage Board for the Augusta Drain Drainage District formally adopts said Project Plan and agrees to implement the selected alternatives for improvements.

BE IT FURTHER RESOLVED, that the Manager of Special Projects, a position currently held by Carrie Cox, P.E., is designated as the authorized representative for all activities associated with the project referenced above, including the submittal of said Project Plan as the first step in applying to the State of Michigan for a Clean Water Revolving Fund Loan to assist in the implementation of the selected alternative.

Yeas:
Nays:
Abstain:
Absent:

I certify that the above Resolution was adopted by the Drainage Board for the Augusta Drain Drainage District on Tuesday, April 25, 2023.

BY:

_____ April 25, 2023
Jim Nash, Oakland County Water Resources Commissioner and Chairperson of the Augusta Drain Drainage District — Date

Michigan Department of Environment, Great Lakes, and Energy
Gretchen Whitmer, Governor
Liesl Eichler Clark, Director

http://www.michigan.gov/egle

Clean Water Revolving Funds
SRF/SWQIF Project Plan Submittal Form

Name of the Project Augusta Drain Drainage District Improvements	**Applicant's Federal Employer Identification Number (EIN)**
Legal Name of Applicant (The legal name of the applicant may be different than the name of the project. For example, a county may be the applicant for bonding purposes, while the project may be named for the particular village or township it serves.) Augusta Drain Drainage District	**Areas Served by this Project** Counties Oakland Congressional Districts 11 State Senate Districts 7 State House Districts 54
Address of Applicant (Street, P O Box, City, State & Zip) One Public Works Building #95W Waterford Twp, MI 48328	
NPDES Permit Number (if permit holder) MI0060089	**Associated SAW Grant Number** (if applicable)
Brief Description of the SRF/SWQIF Project Augusta Drain Drainage District Improvements	
Disadvantaged Community Determination ☒ The applicant is requesting a disadvantaged community determination, and a completed *Disadvantaged Community Status Determination Worksheet* is attached.	
Estimated Total Cost of the SRF/SWQIF Project $920,000	**SRF/SWQIF Construction Start Target Date** June 2024
Name and Title of Applicant's Authorized Representative	
Address of Authorized Representative (if different from above)	**Telephone** **E-Mail Address**
Signature of Authorized Representative	**Date**
Joint Resolution(s) of Project Plan Adoption/Authorized Representative Designation is attached. check here ☒	

A final project plan, prepared and adopted in accordance with the Department's *Clean Water Revolving Funds (SRF and SWQIF) Project Plan Preparation Guidance*, must be submitted by July 1st in order for a proposed project to be considered for placement on a Project Priority List for the next fiscal year. Please send your final project plan with this form to:

WATER INFRASTRUCTURE FINANCING SECTION
FINANCE DIVISION
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
P O BOX 30457
LANSING MI 48909-7957

Appendix F — Asset Management Plan and Asset Lists

AUGUSTA DRAIN DRAINAGE DISTRICT
SUMMARY OF PROPOSED REHABILITATION/REPLACEMENT ASSETS
Structures

Asset-Asset ID	Asset-Asset Type	Asset-Current Condition	Asset-Criticality Score	Action
12736	Storm - Catchbasin	5	5	Rehab/repair
13170	Storm - Catchbasin	5	5	Rehab/repair
10723	Storm - Catchbasin	5	5	Rehab/repair
10720	Storm - Catchbasin	5	5	Rehab/repair
10599	Storm - Catchbasin	5	5	Rehab/repair
10725	Storm - Catchbasin	5	5	Rehab/repair
13111	Storm - Catchbasin	5	5	Rehab/repair
12691	Storm - Catchbasin	5	5	Rehab/repair
10598	Storm - Catchbasin	5	5	Rehab/repair
10602	Storm - Catchbasin	5	5	Rehab/repair
10742	Storm - Catchbasin	5	5	Rehab/repair
1073625	Storm - Catchbasin	5	5	Rehab/repair
10734	Storm - Catchbasin	5	5	Rehab/repair
10653	Storm - Catchbasin	5	5	Rehab/repair
10733	Storm - Catchbasin	5	5	Rehab/repair
10587	Storm - Catchbasin	5	5	Rehab/repair
10651	Storm - Catchbasin	5	5	Rehab/repair
10727	Storm - Catchbasin	5	5	Rehab/repair
10724	Storm - Catchbasin	5	5	Rehab/repair
10660	Storm - Catchbasin	5	5	Rehab/repair
10646	Storm - Catchbasin	5	5	Rehab/repair
10597	Storm - Catchbasin	5	5	Rehab/repair
13135	Storm - Catchbasin	5	5	Rehab/repair
12690	Storm - Catchbasin	5	5	Rehab/repair
10610	Storm - Catchbasin	5	5	Rehab/repair
10650	Storm - Catchbasin	5	5	Rehab/repair
10739	Storm - Catchbasin	5	5	Rehab/repair
404106	Storm - Catchbasin	5	5	Rehab/repair
426	Storm - Manhole	3	5	Rehab/repair
13133	Storm - Catchbasin	5	5	Rehab/repair
10652	Storm - Catchbasin	5	5	Rehab/repair
10596	Storm - Catchbasin	5	5	Rehab/repair
10661	Storm - Catchbasin	5	5	Rehab/repair
10662	Storm - Catchbasin	5	5	Rehab/repair
10735	Storm - Catchbasin	5	5	Rehab/repair
10726	Storm - Catchbasin	5	5	Rehab/repair
10656	Storm - Catchbasin	5	5	Rehab/repair
10608	Storm - Catchbasin	5	5	Rehab/repair
10658	Storm - Catchbasin	5	5	Rehab/repair
10657	Storm - Catchbasin	5	5	Rehab/repair
10600	Storm - Catchbasin	5	5	Rehab/repair
10601	Storm - Catchbasin	5	5	Rehab/repair
10604	Storm - Catchbasin	5	5	Rehab/repair
10654	Storm - Catchbasin	5	5	Rehab/repair
404135	Storm - Catchbasin	5	5	Rehab/repair
10603	Storm - Catchbasin	5	5	Rehab/repair
10606	Storm - Catchbasin	5	5	Rehab/repair
10736	Storm - Catchbasin	5	5	Rehab/repair
7786	Storm - Manhole	3	5	Rehab/repair
7787	Storm - Manhole	3	5	Rehab/repair
1099477	Storm - Manhole	3	5	Rehab/repair

AUGUSTA DRAIN DRAINAGE DISTRICT
SUMMARY OF PROPOSED REHABILITATION/REPLACEMENT ASSETS
Pipes

Asset ID	Diameter, inches	Length, lineal feet	Pipe Material	PACP Structural Quick Rating	PACP Maintenance Quick Rating	Action
21623	10	21	C-14	5223	4100	Spot Line
23372	12	76	C-14	512A	0	Spot Line
22570	12	10	C-14	5200	0	Spot Line
22942	12	18	C-14	5145	0	Spot Line
23447	12	19	C-14	5141	4100	Spot Line
21614	12	50	Plain Concrete	5100	0	Spot Line
23397	12	23	C-14	5100	0	Spot Line
21622	12	14	C-14	5100	0	Spot Line
23882	12	43	C-14	5100	0	Spot Line
22945	12	34	C-14	4435	0	Spot Line
22944	12	23	C-14	4331	3200	Spot Line
1062581	12	54	C-14	4131	2100	Spot Line
21613	12	25	C-14	4121	0	Spot Line
23875	12	6	C-14	4100	0	Spot Line
1081450	15	160	CMP	5100	0	Spot Line
23433	15	141	C-14	4131	1C00	Spot Line
23877	24	69	C76-III	5121	0	Spot Line
23441	36	446	C76-IV	5100	4100	Spot Line
22941	42	60	C76-V	4100	2100	Grout
22948	42	311	C76-V	4100	2100	Spot Line

HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

MEMORANDUM

To: Michigan Department of Environment, Great Lakes, & Energy (EGLE)
Revolving Loan Section
Attn: Karen Nickols

From: Hubbell, Roth and Clark, Inc.

CC: Oakland County Water Resources Commissioner
Augusta Drain Drainage District

Date: December 27, 2019

Re: Augusta Drain Drainage District
EGLE Stormwater, Asset Management and Wastewater (SAW) Grant #1224-01
Summary of Stormwater Asset Management Plan

The following is a summary of the work completed under the EGLE, formerly MDEQ, SAW Grant work performed by the Augusta Drain Drainage District. It includes a summary of the project scope, results and findings of activities covered by the grant, grant amount spent and match amount, and contact information. It has been prepared as required under Section 603 of Public Act 84 of 2015 and follows recent EGLE guidance.

GRANTEE INFORMATION

Augusta Drain Drainage District

SAW Grant Project #1224-01

Project Grant Amount: $339,500

Applicant Match Amount: None (disadvantaged community)

Authorized Representative
Jim Nash, Chairman
Augusta Drain
(248) 858-0958
wrc@oakgov.com

Consultant Contact
Karyn Stickel, Associate
Hubbell, Roth & Clark, Inc.
(248) 454-6566
kstickel@hrcengr.com

Oakland County Water Resources Commissioner's Office Contact
Mike McMahon, Chief Engineer
(248) 858-5397
mcmahonm@oakgov.com

EXECUTIVE SUMMARY

The Augusta Drain Drainage District (ADDD) applied for and received a grant to further develop an Asset Management Plan (AMP) for its sanitary system through the Michigan Department of Environment, Great Lakes, & Energy's (EGLE) Stormwater, Wastewater and Asset Management (SAW) program. Because the SAW program was funded through monies appropriated for water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant, but are considered in analysis and recommendations where appropriate.

The Augusta Drain Drainage District Is operated and maintained by the Oakland County Water Resources Commissioner (WRC) on behalf of the Drainage Board of August Drain created under Chapter 20 in Oakland County under the Drain Code. The WRC has various tools used to manage the assets it owns or operates and maintains, including a GIS geodatabase, collaborative asset management system, hydraulic models, condition assessment methods, risk and prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to operate the various systems in a sustainable manner that meets the required level of service with a focus on prioritizing assets that are most critical and being cost-effective.

The WRC "Common to All" approach was generally followed in development of the asset management plan for this system. The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

STORMWATER INVENTORY

WRC uses its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in the system. The geodatabase includes key attributes associated with each asset, such as installation date (age), size, material, along with other information as needed for a given asset type.

WRC currently uses the Cityworks software package for its Computer Maintenance Management System (CMMS), which then collaborates with the GIS to present a single interface to the user via the Collaboration Asset Management System (CAMS). CAMS assists in managing inspections and maintenance work by generating and tracking work orders, collecting inspection and condition data, and compiling costs and hours spent on each asset. Maintenance history and costs can be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed by Independence to allow for efficient and consistent recording of asset condition. For stormwater assets, the NASSCO-compliant inspection information was collected during televising. The data is stored in the GIS system and will integrate with the Cityworks software to share this data to develop inspection work orders to continue to evaluate and maintain assets, such as manholes, catch basins and pipes. No open channel or detention basin inspections were completed as part of this CIP review.

As part of the grant for Augusta Drain, the GIS geodatabase inventory was reviewed for completeness and to ensure critical attributes were populated. Approximately 27,672 lineal feet of storm pipes underwent condition assessment via cleaning and televising. Approximately 191 manhole and other related structures were evaluated using the NASSCO inspection protocol.

CRITICALITY OF ASSETS

WRC implemented PowerPlan asset optimization software as part of the "Common to All" Program. Baseline Probability of Failure (POF) and Consequence of Failure (COF) factors were configured into the software as part of that Program and were used to estimate the overall risk of the horizontal assets (pipes and associated structures).

Both the POF and COF were scored on a scale of 1 to 5, with 1 being the lowest probability or consequence of failure, and 5 corresponding to the highest probability or consequence of failure. The Business Risk Evaluation (BRE or Risk) score is the product of the POF score and the COF score (POF times COF equals Risk,) and has a scale of 1 to 25. Higher BRE scores identify the assets with the greatest overall risk.

The POF and COF for horizontal assets are determined using scoring values developed uniquely for each asset type, such as gravity main, manhole, etc. The POF and COF scores for each asset type are calculated using attribute data from the GIS geodatabase, inspection data from the recent cleaning and televising, and NASSCO PACP and MACP ratings. The primary attribute for determining the POF of gravity mains (storm pipes) was the PACP Structural Quick Score. The PACP Maintenance Quick Score and age are also incorporated into the POF rating. Where PACP scores were not available, the POF score was based on the age-based assumed condition.

For manholes and other access structures, the POF is based primarily on the MACP fields cover condition, frame condition, chimney condition, cone condition, wall condition, bench condition, and channel condition along with age. If the MACP data was not available, the score was based on just age.

The COF for mains and access points (storm and related structures) was determined based on asset depth, size, proximity to groundwater and flood zones, and proximity to roads and intersections.

LEVEL OF SERVICE DETERMINATION

At the strategic level, the Level of Service (LOS) identifies the long-term goals and strategies of the organization. An overall LOS guiding matrix was developed to document the goals and strategies of the WRC organization. The WRC Mission Statement and the annual LRP process form additional elements of the LOS.

The WRC's current Mission Statement is:

> *The Oakland County Water Resources Commissioner's Office is dedicated to the preservation and protection of our water environments, public health, welfare, convenience and the citizen's right to quality water. We are committed to acting with integrity and professionalism and will always seek collaboration among our Oakland County communities and regional partners.*
>
> *We commit ourselves to providing our customers with high value services that are fairly priced, environmentally sound and sustainable in the long term. We are committed to an open dialogue with our communities and promise to keep lines of communication open.*

In our pursuit of excellence and continuous improvement, every member of our staff will respond to issues of the public promptly, safely, respectfully and with sensitivity to their individual needs. Our office will always endeavor to provide an appropriate resource when an issue is not within our authority.

We will install a culture that perpetuates an environment promoting trust, respect and teamwork, both within our organization and among our communities and region.

The WRC strategic Level of Service Goals included:

- Financial Viability and Impact. Goal: Emergency repairs can be repaired within Utility Reserve Budgets of the system. Measurable: Exceedances of reserve budgets. *(Note that this WRC strategic goal does not apply to drainage districts because reserve budgets are not developed for these stormwater systems.)*
- Public Confidence and System Service Impact. Goal: Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise.) Measurable: Number of service interruptions, complaints, and backups.
- Regulatory Compliance. Goal: No state permit violations and comply with all MDEQ polices. Measurable: Number of violations.
- Safety if Public Employees. Goal: Non-reportable injuries, no lost-time injuries or medical attention required. No impact to public health. Measurable: Number of injuries and any public health advisories.
- Redundancy. Goal: Comply with 10 State Standards. Measurable: Number of violations.
- Risk and BRE score. Goal: 70% of assets have a BRE less than 15. Measurable: System risk score.
- Staffing. Goal: Staffing levels and training maintained to meet level of service. Measurable: Number of open positions, training hours.

At the tactical level, the LOS focuses on the prioritization in the medium-term and identification of factors and indicators related to performance, cost, risk, and failure probability. The Probability of Failure and Consequence of Failure scoring matrices used in the criticality and risk analysis were developed using the strategic LOS guidance. Progress toward the goals are measured through the CAMS analytic data and is reviewed as part of the budgeting process with internal staff and customers.

At the operational level, the LOS is related to procedures and information related to the short-term, day-to-day operation. Performance is measured at the asset level using work orders to collect data and annual reporting of measurable and progress toward goals with operational staff.

REVENUE STRUCTURE

The annual operation and maintenance budget includes the typical costs spent each year to operate the system and to perform normal maintenance activities. This baseline O&M budget does not include major capital improvements that are required to increase capacity, meet new regulatory requirements, or replace items that have failed or reached the end of their useful service life.

The asset optimization software assisted WRC staff by developing recommended strategies for inspection, rehabilitation and replacement needs over the long-term for each system based on condition and risk. WRC project management staff then reviewed the recommendations generated by the software and

rationalized the recommendations to “real word” needs, including any improvements required due to capacity or regulation changes. The WRC typically uses this information as part of its existing Long Range Plan (LRP) process to prioritize projects and ensure adequate funding is available.

The LRP process is a tool to determine utility rates and charges to provide sufficient revenues to cover the anticipated operation, maintenance, replacement, capital improvement projects, and debt costs associated with a given system, as well as to maintain a reserve balance for emergencies or a significant one-time charge. It ensures adequate revenues are collected for budgeted needs in the current year, and over the long term. The stormwater and Drainage District funds do not currently use the LRP rate process but the overall framework is set up to accommodate these systems in the future. Revenue for the drainage districts is generated through special assessments to the benefiting public entities according to percentages established by the Drainage Board in accordance with the Michigan Drain Code, Act 40 of 1956.

CAPITAL IMPROVEMENT PLAN

The asset optimization software forecasts and prioritizes assets that require replacement in the planning period. The individual replacements can be combined into projects and scheduled with budget amounts established. This information is then used in the LRP process to determine revenue needs to funding the project established. A list of capital projects was developed for Augusta Drain, using recommendations from the asset optimization software, and consideration of other system needs. These projects will be constructed as funding allows.

The recommended projects are summarized below. Projects listed for implementation in the 0 to 5 year range include cost estimates prepared on data available at the study/feasibility level. Projects in the 6 to 20 year range are based on broad concepts only and costs are based on cost curves and other general tools. All projects are listed for financial and resource planning purposes only. Changes to project inclusion, scope, cost and/or timing are expected as resources are allocated and changes occur in prioritization, regulations, technology, cost and other data becomes available.

Capital Projects, 0 to 5 years:

- Grout Joint – $1,000
- Spot Line – $24,100
- Manhole Repairs – $53,000
- Rehabilitation and/or replacement of the Drop Fall Chamber -- $100,000 to $150,000 for rehabilitation or replacement of the structure, respectively
- Rehabilitation of the Junction Chamber to extend its service life by repairing cracks using a structural pressure injected epoxy and patching spalls and leaks in the structure walls. -- $50,000

Capital Projects, 6 to 20 years:

- Manhole Replacement – $394,000
- No replacement or rehabilitation events for storm pipes; will be based on forecasted age-deterioration in PowerPlan – TBD

RECOMMENDATIONS

In order to keep this AMP sustainable into the future, periodic review of the recommendations, status of current projects, and forecasted needs will be reviewed against any available and anticipated funding.

The asset optimization tool will be regularly synced with CAMS to incorporate any new GIS and operational and condition data. The software will then automatically update recommended events, treatment and replacement strategies, and capital projects. The updated recommendations should be reviewed periodically to assist with determining the funds required for the required projects.

LIST OF MAJOR ASSETS

The system's major assets include:

- 4,480' of open channel drain
- 74 catch basins
- 135 manhole structures
- 13 inlets/no structure inlets
- 17 pipe outlets and special structures
- 24' of Circular 10" pipe
- 3,255' of Circular 12" pipe
- 1,617' of Circular 15" pipe
- 1,347' of Circular 18" pipe
- 976' of Circular 21" pipe
- 1,004' of Circular 24" pipe
- 563' of Circular 27" pipe
- 712' of Circular 30" pipe
- 2,082' of Circular 36" pipe
- 1,307' of Circular 42" pipe
- 367' of Circular 60" pipe
- 47' of Circular 72" pipe
- 1,103' of Circular 78" pipe
- 7,179' of Circular 126" pipe
- 3,577' of Circular 144" pipe
- 1,087' of Elliptical 103" x 71" pipe
- 950' of Rectangular 120" x 120" pipe
- 411' of Rectangular 126" x 126" pipe
- 71' of 144" x 132" culvert pipe
- 420' of 288" x 138" culvert pipe
- TOTAL of 28,099 enclosed pipe

PROJECT HIGHLIGHTS

The development of this Asset Management Program for the Augusta Drain Drainage District was led by HRC with assistance from WRC. The following highlights some of the more tangible outcomes from the Program development:

- Updated GIS inventory of system to include all age, material, and size information.
- Inspected 27,672 lineal feet (98%) of the storm drain system.
- Inspected 191 catch basin or manhole structures.
- Developed list of high consequence crossings for incorporation into the GIS.
- Performed a structural evaluation of the Drop Fall Structure and Junction Chamber.
- Generated a 5 and 20-year Capital Improvement Plan (CIP) for the system.

EGLE

Department of Environment, Great Lakes, and Energy (EGLE)
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: December 31, 2019
(no later than 3 years from executed grant date)

The **August Drain Drainage District** certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1224-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to EGLE or the public upon request by contacting:

Jim Nash	at	248-858-0958	wrc@oakgov.com
Name Phone		Number	Email

12-27-2019

Signature of Authorized Representative (Original Signature Required) Date

Jim Nash, Chairman of the Drainage Board and Oakland County Water Resources Commissioner
Print Name and Title of Authorized Representative

Appendix G — Overburdened and Significantly Overburdened Form

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

OVERBURDENED AND SIGNIFICANTLY OVERBURDENED COMMUNITY STATUS DETERMINATION WORKSHEET

The following data is required from each State Revolving Fund (SRF) applicant requesting a determination for overburdened and significantly overburdened community status.

The most recent census and tax data are available in a searchable table on EGLE's State Revolving Fund – Overburdened Community Definition and Scoring Criteria Development webpage along with an excel worksheet to help determine blended Median Annual Household Income (MAHI) and blended taxable value per capita for regional systems. The MAHI and taxable value per capita table will be used to make all FY24 determinations. Applicants are encouraged to visit this page prior to completing this form to see if they qualify based on MAHI (blended MAHI if applicable) or taxable value per capita (blended taxable value per capita if applicable) alone. If so, they only need to fill out lines 1 and 2 of this form, electronically sign it on page 2, and submit.

Alternately, **if the applicant's MAHI or blended MAHI is above the state average - $63,498 for FY24 – they cannot be determined as being overburdened or significantly overburdened for FY24 funding and should not complete or turn in this form**.

For applicants whose MAHI or blended MAHI is below $63,498 but do not automatically qualify based on MAHI or taxable value per capita alone, please complete the entire form and return to:

Mark Conradi
conradim@michigan.gov

Name of Applicant

Augusta Drain Drainage District (Oakland County WRC)

Please check the box indicating which funding source this determination is for:

DWSRF ☐

CWSRF ☑

1. Is this a regional system? A regional system refers to any system that serves more than one municipality (cities, townships, and/or villages)

Yes ☐
No ☑

If yes, refer to the instructions at the end of this form to complete calculations for a blended MAHI and blended taxable value per capita. Additionally, page 3 of this form will also need to be completed.

2. Median Annual Household Income from table on the overburdened webpage (blended if applicable)

   $36,214

3. Taxable Value Per Capita from table on the overburdened webpage (blended if applicable)

   $14,274

4. Total amount of anticipated debt for the proposed project (amount of loan requested for FY24 loan)

5. Annual payments on the existing debt for the system

6. Total operation, maintenance, and replacement expenses (OM&R) for the system on an annual basis

7. Number of residential equivalent users (REUs) in the system

***I (_____) hereby certify that the information in this form is complete, true, and correct to the best of my knowledge.**

Signature Date

For determinations made using anticipated debt, a final determination will be made based upon the awarded loan amount and not the anticipated amount provided on this form.

Overburdened and Significantly Overburdened Calculation Worksheet

2. Median Annual Household Income (blended if necessary)	$36,214
3. Taxable Value Per Capita (blended if necessary)	$14,274
4. Amount of anicipated debt - FY24 SRF loan only	
Terms	20
Rate	2.75%
New Annual debt from SRF loan	$0
5. Annual Payments on existing debt	
6. Total OM&R	
7. Number of REUs	
Total Annual Cost	$0
Annual User Cost	$0
MAHI Threshold $ amount	**$362**

Applicant Name:
Augusta Drain Drainage District
Oakland County Water Resources Commissioner

			Result
125% of Federal Poverty MAHI	$37,500	**Significantly Overburdened**	**YES**
Lowest 10% TVPC	$15,170	**Significantly Overburdened**	**YES**
Lowest 20% TVPC	$22,920	**Overburdened without calculation needed**	**YES**
Michigan MAHI	$63,498	**Overburdened with calculation**	**NO**

Appendix H — Augusta Drain Drainage District TMDLs

DRAFT

Total Maximum Daily Load for *E. coli* in the Lower Clinton River

Macomb, Oakland, and St. Clair Counties

Michigan Department of Natural Resources and Environment

April 2010

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Michigan Department of Natural Resources and Environment
May 2010

Total Maximum Daily Load for *E. coli* for the Lower Clinton River Macomb, Oakland, and St. Clair Counties

INTRODUCTION

Section 303(d) of the federal Clean Water Act (CWA) and the United States Environmental Protection Agency's (USEPA's) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations, Part 130) require states to develop Total Maximum Daily Loads (TMDLs) for water bodies that are not meeting water quality standards (WQS). The TMDL process establishes the allowable loadings of pollutants for a water body based on the relationship between pollution sources and in-stream water quality conditions. TMDLs provide states a basis for determining the pollutant reductions necessary from both point and nonpoint sources to restore and maintain the quality of their water resources. The purpose of this TMDL is to identify the allowable levels of *Escherichia coli* (*E. coli)* that will result in the attainment of the applicable WQS in the Clinton River, located in Macomb, Oakland, and St. Clair Counties, Michigan (Figure 1).

PROBLEM STATEMENT

This TMDL addresses the assessment units (AUIDs) and listings that appear on the 2008 Section 303(d) list (LeSage and Smith, 2008) as:

CLINTON RIVER **AUID**: 040900030402-01
County: Macomb SIZE: 43.3 M
Location: Clinton River and Unnamed Tributaries to Clinton River.
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Combined Sewer Overflows from Pontiac.
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030402-02
County: Macomb SIZE: 10.3 M
Location: Clinton River from Gratiot Avenue downstream to the mouth.
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Combined Sewer Overflows from Pontiac.
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030402-03
County: Macomb SIZE: 27.8 M
Location: Clinton River
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Combined Sewer Overflows from Pontiac.
TMDL Year(s): 2010

This TMDL also addresses the AUIDs described in Appendix 1 proposed for inclusion on the Department of Natural Resources and Environment's (DNRE's) 2010 Section 303(d) list. The Main Branch Clinton River, downstream of Yates Dam near Rochester, was first placed on the Section 303(d) list in 1998 due to impairment of recreational uses by *E. coli* (Creal and Wuycheck, 1998). Monitoring data collected by the DNRE in 2008 for the Main, North, and Middle Branch Clinton River and tributaries documented multiple exceedances of the daily maximum and 30-day geometric mean WQS for *E. coli* during the total body contact (TBC) recreational season of May 1 through October 31, and periodic exceedances of the partial body contact (PBC) WQS (Table 1-4; Figures 4-6). This TMDL addresses the entirety of the Middle Branch, Main Branch downstream of Rochester (including Harrington Drain), and the North Branch Clinton River from 33-Mile Road downstream to the confluence with the Main Branch (including tributaries) (Figure 1). Monitoring data collected by the DNRE in 2008 on Paint Creek and the Main Branch Clinton River upstream of the TMDL reach (Figure 1) indicate that these waters are also not attaining the TBS and PBC recreation designated use, and will be included on the 2012 Section 303(d) list and a TMDL scheduled. There are several water bodies with approved *E. coli* TMDLs adjacent to the water bodies addressed by this TMDL: these are, Red Run Drain and Bear Creek, East Coon Creek, Deer Creek, and East Pond Creek (Figure 1).

The TMDL reach is located in the Clinton River watershed (Hydrologic Unit Code 4090003), which flows into Lake St. Clair (Figure 1). The Clinton River TMDL watershed covers 127,200 acres (about 198 square miles) of Macomb, Oakland, and St. Clair Counties and is composed of 17 minor civil divisions (Table 6). The infrastructure for the city of Detroit alters the hydrology of the Clinton River watershed such that discharges to the municipal system within the Clinton River watershed area are routed to the Detroit River watershed. Therefore, sources of *E. coli* from the Detroit municipal boundaries are not addressed in this TMDL. The Clinton River watershed was home to a population of about 334,200 people in 2008, based on data in the 2000 census (U.S. Census Bureau, 2000) and an estimated 5.4 percent increase in population from 2000-2008 (SEMCOG, 2008).

The Clinton River TMDL watershed is located within the Maumee Lake Plain ecosystem type (Subsubsection VI.1.1), which is characterized by flat, clay lake plain with loamy and somewhat poorly drained soils, ideal for agriculture when artificial drainage is used (Albert, 1995). Areas of well-drained, sand-dominated soils bisect the clay plains formed by glacial drainage ways. Prior to European colonization, extensive marshes occurred along the shores of Lake St. Clair and extended upstream for several miles on major rivers such as the Clinton River. Upslope of the marshes were deciduous swamps followed by beech-sugar maple forests on the upland areas (Albert, 1995). Land cover data (2006) was used to calculate the land cover types of the entire TMDL watershed, as well as a breakdown of land cover in the Main, Middle, and North Branches (Table 5) (NOAA, 2008b). The portion of the North Branch Clinton River within the TMDL watershed (Figure 1) is largely agricultural with 37 percent of the land area used for cultivated row crops, and an additional 17 percent as pasture or hay. The Middle Branch Clinton River, which is entirely within the TMDL watershed, is 47 percent low, medium, and high intensity developed land, which was mainly single family residential according to land use data from 2000 (SEMCOG, 2009). Agriculture in the Middle Branch Clinton River occupies 16 percent of the land area (cultivated cropland and pasture/hay combined). Land cover in the Main Branch Clinton River area of the TMDL watershed is dominated by low, medium, and high intensity development, which together occupy 73 percent of the land area. No land area within the Main Branch Clinton River TMDL boundary is used for agriculture; however, this does not exclude agricultural sources to the sites located directly on the Main Branch Clinton River

(Stations CR1-3, 5, 7-11, and 13), because some of the land upstream of the TMDL reach is used for agriculture, but was not included in the analysis in Table 5.

NUMERIC TARGET

The impaired designated uses addressed by this TMDL are TBC and PBC recreation. The designated use rule (Rule 100 [R 323.1100] of the Part 4 rules, WQS, promulgated under Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended) states that this water body be protected for TBC recreation from May 1 through October 31 and PBC recreation year-round. The target levels for these designated uses are the ambient *E. coli* standards established in Rule 62 of the WQS as follows:

> R 323.1062 Microorganisms.
> Rule 62. (1) All waters of the state protected for total body contact recreation shall not contain more than 130 *E. coli* per 100 milliliters (mL), as a 30-day geometric mean. Compliance shall be based on the geometric mean of all individual samples taken during five or more sampling events representatively spread over a 30-day period. Each sampling event shall consist of three or more samples taken at representative locations within a defined sampling area. At no time shall the waters of the state protected for total body contact recreation contain more than a maximum of 300 *E. coli* per 100 mL. Compliance shall be based on the geometric mean of three or more samples taken during the same sampling event at representative locations within a defined sampling area.
>
> (2) All surface waters of the state protected for partial body contact recreation shall not contain more than a maximum of 1,000 *E. coli* per 100 milliliters. Compliance shall be based on the geometric mean of 3 or more samples, taken during the same sampling event, at representative locations within a defined sampling area.

For this TMDL, the WQS of 130 *E. coli* per 100 mL as a 30-day geometric mean and 300 *E. coli* per 100 mL as a daily maximum to protect the TBC use are the target levels for the TMDL reach from May 1 through October 31, and 1000 *E. coli* per 100 ml as a daily maximum year-round to protect the PBC use. The 2008 monitoring data indicated daily maximum and 30-day geometric mean exceedances at all stations. The PBC WQS was exceeded at least once at all stations.

A sanitary wastewater discharge is considered in compliance with the WQS of 130 *E. coli* per 100 mL if the National Pollutant Discharge Elimination System (NPDES) permit limit of 200 fecal coliform per 100 mL as a monthly average is met. This is assumed because *E. coli* are a subset of fecal coliform (American Public Health Association, 1995). Fecal coliform concentrations are substantially higher than *E. coli* concentrations when the wastewater of concern is sewage (Whitman, 2001). Therefore, typically it can be assumed that there are less than 130 *E. coli* per 100 mL in the effluent when the point source discharge is meeting its limit of 200 fecal coliform per 100 mL.

DATA DISCUSSION

Weekly *E. coli* data were collected by the DNRE from 25 sites from June 4-October 1, 2008, (Tables 1-3). Stations NB1-NB8 are located on the North Branch, CR1-CR13 are located on the Main Branch (and tributaries to the Main Branch), and MB1-MB4 are located on the Middle Branch Clinton River (Figure 1). The daily maximum TBC standard (300 *E. coli* per 100 mL)

and PBC recreation daily maximum standard (1000 *E. coli* per 100 mL) were exceeded at all stations and the daily maximum TBC standard was exceeded on all sample dates at three of the stations (CR3, CR6, and MB4).

Station geometric means were calculated using all weekly data collected at each station throughout the sampling period (Table 4). *E. coli* daily maximum and 30-day geometric mean data for 2008 are shown in Tables 1-3 and Figures 4-6. Based on the station geometric means of all 25 sites sampled within the TMDL reach, CR3 on Harrington Drain had the highest concentrations of *E. coli* (1,778 *E. coli* per 100 mL) followed by CR6 on Red Run Drain (1,686 *E. coli* per 100 mL) (Table 4). CR1 on the Clinton River Spillway had the lowest overall station geometric mean (249 *E. coli* per 100 mL). The highest daily maximum *E. coli* concentration of 32,166 *E. coli* per 100 mL was recorded at Station CR5 on July 8, 2008, following a minor rainfall of 0.09 inches. Station CR3, located on Harrington Drain, had the highest station geometric mean of all stations and also the greatest number of PBC WQS exceedances of all stations in the entire TMDL watershed. Results from the three branches of the Clinton River will each be discussed separately.

Precipitation data for the two days prior to each DNRE sampling event were obtained from a weather station at Romeo, Michigan (MAWN, 2008) for the North Branch and Middle Branch Clinton River (Tables 1 and 3), and the Pontiac Wastewater Treatment Plant (WWTP) (NOAA, 2008a) for the Main Branch (Table 2). Overall, precipitation at the Romeo-based weather station showed near average amounts of precipitation in June and July 2008. Below average precipitation was observed in August 2008 (observed=1.82 inches, average=3.0 inches), and precipitation observed in September 2008 was more than 3 times the average amount (observed=6.81 inches, average=2.2) based on 25 years of precipitation data (NOAA, 2008a). The Clinton River United States Geological Survey (USGS) gauge (4165500) located at Moravian Road shows that flows responded accordingly to the increased rainfall in September. The Main Branch Clinton River was at a near record low flow of 74 cubic feet per second (cfs) on September 1, 2008. The discharge from the Clinton River increased dramatically, from 295 cfs on September 9, 2008 (near the historic monthly mean) to 1,280 cfs on September 10, 2008. A series of storms from September 7-9, 2008, resulted in the hydrograph peaking at a maximum flow of 7,910 cfs on September 15, 2008.

In addition to weekly *E. coli* samples, samples for bacterial source tracking analysis to determine sources of fecal contamination were also collected from CR3 (Harrington Drain), CR12 (Paint Creek), MB3 (Gloede Drain), NB2 (Coon Creek), and NB7 (McBride Drain). Samples from CR3, NB2, and NB7 were collected on September 3, 2008. Samples from CR12 were collected on September 24, 2008. Samples were collected from MB3 and NB2 for a second time on October 1, 2008. Each sample was analyzed for fecal *Bacteriodetes* human and bovine (cattle) gene biomarkers by polymerase chain reaction; these results are shown in Table 4. Since *Bacteriodetes* are strict anaerobes, and cannot survive long outside their host, the detection of this biomarker indicates recent or nearby human or bovine fecal pollution. Positive human *Bacteroidetes* results were found at Stations CR3, CR12, MB3, NB2, and NB7. Positive bovine Bacteroidetes results were found at Stations NB2 and NB7.

Main Branch Clinton River

Of the nine stations located directly on the Main Branch Clinton River, the *E. coli* concentrations tended to increase from upstream to downstream (Table 2). These results can be interpreted to mean that additional sources of *E. coli* were entering the Main Branch Clinton River as it flowed downstream, rather than a single upstream source, which would have been

gradually diluted by any uncontaminated tributaries or storm water. A notable increase in *E. coli* concentration occurred downstream of the Red Run Drain confluence with the main stem river (between stations CR5 and CR7). With the exception of Station CR1 (located on the emergency spillway), the *E. coli* data from stations downstream of the Red Run Drain confluence with the Main Branch Clinton River (CR2-CR6) all followed similar trends in *E. coli* concentrations over time (Figure 4). *E. coli* concentrations at sites downstream of Red Run Drain (CR2-CR6) tended to be more variable over time and reached maximum concentrations in late July, decreased through August, and increased dramatically through late September; whereas, *E. coli* concentrations upstream of Red Run Drain (CR7-CR13) reached their maximum at the beginning of the sampling season in late June, decreased and remained fairly stable from August through the end of September (Figure 4).

Of the 18 sampling events, 10 events were preceded by rainfall according to records kept by the Pontiac WWTP. *E. coli* concentrations at Stations CR2-CR6 (those downstream of Red Run Drain including Harrington Drain), and CR8 tended to be elevated following precipitation. All stations in the Main Branch Clinton River, except CR1 on the spillway, exceeded the PBC WQS on the June 25, 2008 sampling event, which were collected the day following a rainfall of 0.21 inches. The human *Bacteroidetes* biomarker was detected at Station CR3 on September 3, 2008, and CR12 on September 24, 2008. Bovine *Bacteroidetes* was not detected at either CR3 or CR12.

Middle Branch Clinton River

Each of the four stations located on the Middle Branch Clinton River study area exceeded the daily maximum TBC WQS for most, if not all, of the sampling season. The daily maximum TBC WQS was exceeded on 100 percent of sampling events at MB4, 94 percent at Stations MB1 and MB3, and 89 percent of events at Station MB2. The 30-day geometric mean TBC WQS was exceeded throughout the sampling season at all four of the Middle Branch Clinton River stations. The number of PBC WQS exceedances at each station increased at the further downstream locations, as did the station geometric means (Table 4). Station MB3, on Gloede Drain, had the highest station geometric mean of the four Middle Branch Clinton River stations. The 30-day geometric mean of Stations MB3 and MB4 increased gradually toward the end of the sampling season (Figure 5), and Station MB4 consistently exceeded the daily maximum PBC WQS for the last 4 weeks of sampling, beginning with the September 10, 2008, sample (Table 3). Exceedances of the PBC WQS at Middle Branch Clinton River stations occurred in both wet and dry weather. The two largest rain events captured by the sampling (June 11 and September 10, 2008) resulted in exceedances of the WQS at Stations MB2, MB3, and MB4 (Table 3). Human *Bacteroidetes* was detected in a sample from MB3, from Gloede Drain, on October 1, 2008. Bovine *Bacteroidetes* was not detected at MB3.

North Branch Clinton River

Of the eight stations in the North Branch Clinton River study area, results at Station NB2 on Coon Creek were consistently the highest, resulting in exceedances of the PBC WQS on 44 percent of sampling events (Table 1). McBride Drain, Station NB7, had a notably higher station geometric mean when compared with the four stations on the North Branch Clinton River (NB1, NB5, NB6, and NB8) (Table 4). Station NB1, the station located furthest upstream in the watershed, had the lowest station geometric mean (279 *E. coli* per 100 mL) of all stations in the North Branch Clinton River. This station exceeded the PBC WQS on 4 of the 18 sampling dates. *E. coli* concentrations at Stations NB1, NB2, and NB7 were notably affected by wet weather. Of the 7 rain events, which occurred within 2 days prior to sampling, Station NB2

(Coon Creek) exceeded the PBC WQS on 6 events, and Stations NB1 (North Branch Clinton River at 29-Mile) and NB7 (McBride Drain) exceeded the PBC WQS on 4 events. Bovine *Bacteroidetes* biomarkers were detected on September 3, 2008, at Stations NB2 and NB7. Positive human *Bacteroidetes* results were found at NB2 (Coon Creek) on October 1, 2008, and NB7 (McBride Drain) on September 2, 2008.

SOURCE ASSESSMENT

Potential sources to all three branches of the TMDL watershed include illicit connections, failing on-site sewage disposal systems (OSDS), agricultural operations, wildlife and pet waste, dumping of trash, contaminated groundwater, NPDES permitted discharges of storm water, as well as urban runoff. General sources are discussed here, while sources specific to each of the three branches (Main Branch, Middle Branch, and North Branch Clinton River) are discussed separately below.

To assist in determining potential sources to TMDL water bodies, the DNRE conducted a load duration curve analysis for each sampling station as outlined by Cleland (2002). A load duration curve considers how flow conditions relate to a variety of pollutant sources (point and nonpoint sources). The load duration curves for each station show the flow conditions that occurred during sampling, and can be used to make rough determinations as to which conditions result in exceedances of the WQS. The load duration curves for each station sampled in the Clinton River TMDL watershed are included in Appendices 3-5. The USGS gauges which were used to determine the load duration curves for this TMDL are listed and described in Table 9. A ratio of the drainage area of the station locations to the drainage area of the gauged watersheds (defined as the drainage area ratio) was calculated for each of the 25 stations for this TMDL. The curves were generated by applying these drainage area ratios to gauged flows for the period of record (Table 9).

Exceedances that occur during high flows are generally linked with rainfall events, such as surface runoff contaminated with fecal material, a flush of accumulated wildlife feces, or trash from the storm sewers or septic tank failures involving failing drainage fields that no longer percolate properly (surface failures). Exceedances that occur during low flows or dry conditions can generally be attributed to a constant source that is independent of the weather. Examples of constant sources include illicit connections (either directly to surface waters or to storm sewers), some types of OSDS failures, groundwater contamination, and pasture animals with direct stream access. Groundwater contamination of surface water with *E. coli* can occur in areas where septic tanks are too close to surface waters or in areas where livestock or animal waste is allowed to accumulate in close proximity to surface waters.

OSDS are a common method of treatment where sanitary sewers are not available, including, Armada, Chesterfield, Clinton, Harrison, Macomb, Ray, Shelby, Sterling Heights, and Washington Townships. These systems become a potential source of *E. coli* to surface waters when they fail or are poorly designed. Failures occur at varying degrees, resulting in a range of contamination severity, with major failures such as sewage on the ground surface and tanks connected directly to surface waters (also considered illicit discharges) at one end of the scale, and minor failures such as laundry or sinks bypassing the treatment systems at the other end of the scale. The Macomb County Health Department (MCHD) maintains a Point of Sale inspection for OSDS to enforce their Property Transfer Ordinance. The overall rate of OSDS failure for Macomb County was 12 percent during 2008 (this figure does not include laundry and sink violations) (personal communication with MCHD). Oakland County has over 80,000 OSDS in its jurisdiction, but does not have a Point of Sale Ordinance and therefore the precise

failure rate is unknown. However, it is estimated that the OSDS failure rate, including laundry and sink violations) is about 10 percent across Michigan based on an average of existing Point of Sale programs throughout the state (*E. coli* Work Group, 2008).

Of the entire TMDL watershed, 41 percent of the land coverage is a combination of high, low, and medium intensity development, with an additional 10 percent developed open space (NOAA, 2008b). Residences and industrial and commercial buildings within this area are largely connected to the sanitary sewers and are served by storm sewers. The sewers in the TMDL watershed are all separated, meaning that sanitary waste and storm water are transported in separate systems. Sanitary waste is transported to a WWTP, where the effluent is subject to fecal coliform limits (as described in the Reasonable Assurance section). The USEPA's Storm Water Phase II Rules require that all public entities operating Municipal Separate Storm Sewers (MS4s) within urbanized areas obtain municipal storm water permits, unless this requirement is waived by the NPDES permitting authority. The State of Michigan's Phase II Watershed-Based Storm Water General Permit (MIG610000) and the Phase II Jurisdictional-Based Storm Water General Permit (MIS040000) have been developed to meet the federal requirement. The TMDL watershed receives MS4 permitted storm water from 15 minor civil divisions (townships, villages, and cities), 2 counties, and the Selfridge Air National Guard base (Table 8). Macomb County is responsible for approximately 5,895 surface water discharge points according to their 2008 MS4 permit application. Oakland County's permit application states that they have 1,499 known outfalls, though few of these are located within the TMDL watershed. While portions of St. Clair County are within the boundary of this TMDL watershed, the land area makes up less than 1 percent of the TMDL watershed and no MS4 oufalls from St. Clair County discharge to the watershed; therefore, the St. Clair County MS4 has not been included in Table 8. In addition to MS4 permitted discharges within the TMDL watershed, there are four individual NPDES permits, 182 Certificates of Coverage (COCs) under the industrial storm water general permit (MIS110000), 1 COC for petroleum groundwater cleanup (MIG080000), 1 COC for noncontact cooling water (MIS110000), and 1 COC for storm water discharge with required monitoring (MIS120000) (Figure 2, Table 8, and Appendix 2).

The large percentage of area with impervious surface within the Clinton River watershed causes a flush of storm water following precipitation, which can cause storm water to become contaminated with *E. coli* from human litter (such as diapers) and pet and wildlife fecal waste. In addition to pet and wildlife fecal waste on the ground surface, wildlife, including raccoons, opossums, rats, and mice are residents of the storm sewers. Bacteria from these warm-blooded mammals are a certain contributor to the WQS exceedances observed in the urban subwatersheds.

Main Branch Clinton River

Sanitary Sewer Overflows (SSOs) are illegal events that occur when a sanitary sewer discharges raw or inadequately treated sewage to the ground surface or waters of the state rather than being transported to a WWTP. Chronic SSOs usually occur in a predictable location on a somewhat regular basis and can be caused by infiltration or inflow of groundwater into sewers during precipitation events, which in turn causes the system to overload. Three municipalities are responsible for chronic SSOs in the TMDL watershed. These are: Fraser (1 outfall), Center Line (1 outfall), and Clinton Township (7 outfalls) (Figure 3). The municipality of Fraser was responsible for 10 SSO events in 2008 and 12 in 2009. These chronic SSOs all occurred at the Beacon Lift Station and resulted in raw sewage entering Sweeney Drain, a tributary to Harrington Drain, upstream of Station CR3. As an example of the potential impact

of this SSO, the MCHD sampling on Harrington Drain after a June 10, 2008, Fraser SSO event had a result of 54,750 *E. coli* per 100 mL (MCHD, 2008). The DNRE sampling event at the same location (Station CR3) on the day following this Fraser SSO event showed an elevated result (3,806 *E. coli* per 100 mL) and may reflect residual contamination from the SSO event. Clinton Township was responsible for 4 SSO events in 2008 and 2 SSO events in 2009, which resulted in raw sewage entering the Clinton River and Harrington Drain. Center Line was responsible for 2 SSO events in 2008 and 2 SSO events in 2009, resulting in raw sewage entering a tributary to Bear Creek (Red Run Drain), upstream of Station CR6. Due to timing of the events and sampling, DNRE data would not have captured potentially elevated *E. coli* levels from the 2008 events from the Clinton Township or Center Line SSOs. Sampling by MCHD targeted the September 13, 2008, Center Line event, which occurred after 3.72 inches of rain. Macomb County collected a sample just downstream of the Center Line SSO location and found an *E. coli* concentration of 34,480 *E. coli* per 100 mL (MCHD, 2008).

OSDS are not a prevalent method of sanitary waste disposal in the Main Branch Clinton River TMDL watershed, because the majority of this area is sewered; but, there are local areas where OSDS are common, including Shelby, Sterling Heights, and Clinton Townships. In Clinton Township, the OSDS from 347 were determined by the MCHD to be either failing or too close in proximity to the Clinton River. As of November 2008, the OSDS for 54 out of 347 problem homes had been corrected by connecting the homes to a newly constructed sanitary sewer (Clinton Township, 2008). Similar situations may exist in other townships.

Seventy-three percent of the Main Branch Clinton River TMDL watershed is a combination of high, medium, and low intensity developed land, plus an additional 10 percent is categorized as developed open space. This developed land area is largely drained by storm sewers. MS4 permitted discharges for the Main Branch Clinton River include Shelby, Clinton, Macomb, and Chesterfield Townships, Macomb and Oakland Counties, and the cities of Fraser, Utica, Mount Clemens, Center Line, Rochester, and Rochester Hills. Other point sources include the Mount Clemens WWTP (MI0023647) and an additional 161 NPDES permitted discharges to the Main Branch Clinton River and its tributaries (Figure 2). Illicit connections to the storm sewers regulated under MS4 permits are a potential source of *E. coli* to the Main Branch Clinton River.

Positive detections of human *Bacteroidetes* were found in Paint Creek (CR12, upstream of the TMDL reach) and Harrington Drain. No SSOs occurred prior to the collection of these samples, suggesting that illicit connections or failing OSDS are a source of the pathogens.

As mentioned in the Data Discussion of this TMDL, sources of *E. coli* within the Red Run Drain subwatershed are apparently contributing to the impairment of the lower Clinton River downstream of the confluence. This is evident by the pattern of fluctuating *E. coli* concentrations from Main Branch Clinton River stations upstream of the Red Run Drain confluence (CR7-CR13), which responded differently than stations downstream of Red Run Drain (CR1-CR6); a pattern which can be seen in Figure 4 and is described in the Data Discussion of the Main Branch Clinton River stations on Pages 6 and 7. Detailed sampling of the Red Run Drain watershed was conducted for the *E. coli* TMDL approved in 2006 (Lipsey, 2006). Analysis of these data lead the DNRE to conclude that wet weather sources within the Red Run Drain and Bear Creek watersheds were having a significant influence over *E. coli* exceedances and the downstream stations on the Main Branch Clinton River. The data collected in 2008 at Station CR6 for this TMDL support this conclusion.

Based on the 2008 DNRE data, wet weather sources appear to be having a bigger impact on Station CR8 than nearby, upstream Station CR9. Exceedances of the PBC WQS occurred at

Station CR8 after the majority of the recorded rain events (Table 2), while few wet weather exceedances occurred at Station CR9, which is located a few miles upstream of Station CR8. The station geometric mean of CR8 was also higher than the station mean for CR9 (Table 4). Tributaries or outfalls located between Stations CR8 and CR9 should be scrutinized for potential wet weather sources.

According to the load duration curves, low flow conditions were well represented in the sampling for most Main Branch Clinton River stations (Appendix 3). According to the load duration analysis, exceedances of the daily maximum TBC WQS did not occur under low flow conditions at Station CR1, which is likely because the spillway is an artificially constructed overflow designed as a bypass during high flows, and therefore, was not flowing under low flow conditions. At the upstream end of the watershed (Station CR13), only two samples were collected during high flow conditions and both attained the TBC WQS. With the noted exception of Stations CR1 and CR13, exceedances occurred under all flow conditions sampled, at all sites in the Main Branch Clinton River. The dry and mid-range flow *E. coli* exceedances suggest that constant sources, often referred to as "dry weather" sources (e.g., illicit connections), are having a strong influence on the *E. coli* concentrations at the Main Branch Clinton River stations during these flow conditions. Across all stations, very few samples were collected during high flows or moist conditions, although sampling during these conditions generally revealed exceedances of the daily maximum TBC WQS.

Middle Branch Clinton River

High, medium, and low density developed land occupies 47 percent of the Middle Branch Clinton River, which is largely single family residential land use (SEMCOG, 2009). This land area is generally drained by storm sewers. MS4 permitted discharges that discharge to the Middle Branch Clinton River include Shelby, Macomb, Washington, Romeo, and Clinton Townships, and Macomb County. Illicit connections to the storm sewers are a potential source of *E. coli* to the Middle Branch Clinton River. In addition to the MS4s, there are 23 NPDES permitted discharges to the Middle Branch Clinton River, none of which are WWTPs (Figure 2). A positive detection of human *Bacteroidetes* was found in a sample collected from Gloede Drain (MB3) during dry conditions. No SSOs have been reported in the Middle Branch Clinton River, suggesting that illicit connections or failing OSDS are a likely source of the pathogens.

Based upon the number of repair permits issued by the MCHD in 2008, Shelby Township has a high concentration of malfunctioning OSDS. OSDS repair permits issued within Shelby Township are consistently higher than other townships in Macomb County (personal communication with MCHD). Communities in northern Shelby Township were constructed in the 1970s with on-site systems rather than being connected to a sanitary sewer. In 2008 alone, 104 repair permits were issued in Shelby Township. To put that into context, the next highest number of permits issued within the county was 16, issued in neighboring Macomb Township in 2008 (MCHD, personal communication). Although the soils in Shelby Township are well drained and are appropriate for these systems to function well, even on the small sized lots in these neighborhoods, the aging systems fail at high rates, resulting in varying degrees of groundwater and surface water contamination by sewage. It should be noted that the issuance of a repair permit does not assure that the repair was actually completed. The high number of repair permits issued is a positive sign that potential sources of fecal contamination are being remedied, but is also an indicator that a significant problem may exist in older neighborhoods of Shelby Township.

Upstream portions of the Middle Branch Clinton River are agricultural. Approximately

ten percent of the land cover in the Middle Branch Clinton River is categorized as row crops and an additional six percent is pasture or hay. This land is mainly upstream of Station MB1 at 25-Mile Road (Figures 1 and 2). No bovine *Bacteroidetes* biomarker was found in the MB3 sample from October 1, 2008; however, these negative results do not exclude cattle as a source to the Middle Branch Clinton River.

Overall for the Middle Branch Clinton River, 7 sampling dates occurred during dry conditions, 7 during mid-range conditions, 3 in moist conditions, and 1 in high conditions. No samples were collected during low flow conditions. Load duration curves for Middle Branch Clinton River stations (MB1-MB4) indicate that exceedances of the daily maximum TBC WQS occurred under all flow conditions that were sampled, from high flows to dry conditions (Appendix 4).

North Branch Clinton River

Nine percent of the land area in the North Branch Clinton River TMDL watershed is a combination of high, medium, and low density developed land, with an additional 5 percent as developed open space. This urbanized area is considerably less than in the Main or Middle Branches, but storm sewers are used in these areas. MS4s that discharge to the North Branch Clinton River include Macomb, Clinton, Romeo, and Chesterfield Townships, Macomb County, and the city of Mount Clemens. Illicit connections to the storm sewers regulated under MS4 permits are a potential source to the North Branch Clinton River. In addition to the MS4 discharges, there are 4 NPDES permitted discharges to the North Branch Clinton River (Figure 2). New Haven Schools – Ray Township is the only WWTP that discharges to the North Branch Clinton River. The majority of the land area is not served by sanitary or storm sewers. In these areas OSDS are the only method for sanitary waste disposal. Positive detections of human *Bacteroidetes* suggest that illicit connections or failing on-site treatment systems are a source of pathogens to Coon Creek (NB2) and McBride Drain (NB7).

In the North Branch Clinton River, livestock and manure spreading are a potential source of *E. coli*. The bovine *Bacteroidetes* biomarker was detected on Coon Creek (NB2) and McBride Drain (NB7). Thirty-seven percent of the North Branch Clinton River land area is cultivated for row crops and another 17 percent are used for pasture or hay, and therefore, are potentially available for manure land application. While there are no permitted Concentrated Animal Feeding Operations (CAFOs) in the TMDL watershed, there is a CAFO upstream of the TMDL watershed near Romeo, Michigan. This CAFO (Ingleside – MIG010157) manifests (sells or gives away) its manure to other farmers. It is therefore not possible to know where, when, or if the manure from this operation is land applied within the TMDL watershed. According to the 2007 Census of Agriculture, there are 4,271 cattle, 1,356 horses, and 301 swine living in Macomb County (United States Department of Agriculture, 2007).

Station NB1, the furthest upstream station on the North Branch Clinton River, had four exceedances of the PBC WQS, and all of those samples were collected immediately following rainfall events. Between these PBC WQS exceedances, the daily maximum TBC and PBC WQS were generally met. These wet weather PBC exceedances indicate that contaminated storm runoff is a likely source of *E. coli* contamination at Station NB1. Three miles further downstream, at Station NB5, additional exceedances of the WQS were observed; but, these exceedances of the TBC WQS occur at lower concentrations than at NB1 and occur across all weather conditions. One major tributary (Camp Brook Drain) enters the North Branch Clinton River between Stations NB1 and NB5. Additional constant sources of either human or animal nature in this subwatershed or directly to the North Branch Clinton River between NB1 and NB5 may be contributing to the persistent daily maximum TBC WQS exceedances at the NB5.

According to the DNRE load duration analysis of the North Branch Clinton River stations, seven sampling dates occurred during dry conditions, seven during mid-range conditions, three in moist conditions, and 1 in high conditions (Appendix 5). No samples were collected during low flow conditions. Load duration curves for most North Branch Clinton River stations (NB1, NB2, and NB5-NB8) indicate that exceedances of the daily maximum TBC WQS occurred under all flow conditions that were sampled, from high flows to dry conditions. Exceedances during all flow conditions indicate that there are multiple sources of *E. coli* contamination to the North Branch Clinton River, e.g., storm runoff contaminated by manure applications, illicit connections, and failing OSDS. This pattern of exceedances at all flow conditions varied only at Station NB3 on the East Branch Coon Creek and Station NB4, immediately downstream of the confluence with the East Branch Coon Creek. At Stations NB3 and NB4, the majority of exceedances occurred during mid-range flows and dry conditions indicating a constant source originating on the East Branch Coon Creek and affecting Coon Creek. The East Branch Coon Creek sources were assessed as part of an *E. coli* TMDL approved by the USEPA in 2006. Agricultural runoff, illicit connections, failing or poorly operating OSDS, and urban runoff were all listed as possible sources of *E. coli* to the East Branch Coon Creek watershed (Cooper and Alexander, 2006).

LOADING CAPACITY (LC) DEVELOPMENT

The LC represents the maximum loading that can be assimilated by the water body while still achieving WQS. As indicated in the Numeric Target section, the targets for this pathogen TMDL are the TBC 30-day geometric mean WQS of 130 *E. coli* per 100 mL, daily maximum of 300 *E. coli* per 100 mL, and the PBC daily maximum WQS of 1000 *E. coli* per 100 ml. Concurrent with the selection of a numeric concentration endpoint, development of the LC requires identification of the critical condition. The “critical condition” is defined as the set of environmental conditions (e.g., flow) used in development of the TMDL that results in attaining WQS and has an acceptably low frequency of occurrence.

For most pollutants, TMDLs are expressed on a mass loading basis (e.g., pounds per day). For *E. coli*, however, mass is not an appropriate measure, and the USEPA allows pathogen TMDLs to be expressed in terms of organism counts (or resulting concentration). Therefore, this pathogen TMDL is concentration-based, consistent with R 323.1062, and the TMDL is equal to the TBC target concentrations of 130 *E. coli* per 100 mL as a 30-day geometric mean and daily maximum of 300 *E. coli* per 100 mL in all portions of the TMDL reach for each month of the recreational season (May through October) and PBC target concentration of 1000 *E. coli* per 100 mL as a daily maximum year-round. Expressing the TMDL as a concentration equal to the WQS ensures that the WQS will be met under all flow and loading conditions; therefore, a critical condition is not applicable for this TMDL.

LC

The LC is the sum of individual waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the LC must include a margin of safety (MOS), either implicitly within the WLA or LA, or explicitly, that accounts for uncertainty in the relation between pollutant loads and the quality of the receiving water body. Conceptually, this definition is denoted by the equation:

$$LC = \sum WLAs + \sum LAs + MOS$$

The LC represents the maximum loading that can be assimilated by the receiving water while still achieving WQS. Because this TMDL is concentration-based, the total loading for this TMDL is equal to the TBC WQS of 130 *E. coli* per 100 mL as a 30-day geometric mean and 300 *E. coli* per 100 mL as a daily maximum during the recreation season and PBC WQS of 1000 *E. coli* per 100 mL as a daily maximum year-round.

WLAs

The WLA for the facilities listed in Table 8 and Appendix 2 are equal to 130 *E. coli* per 100 mL as a 30-day geometric mean and 300 *E. coli* per 100 mL as a daily maximum during the recreational season between May 1 and October 31, and 1000 *E. coli* per 100 mL as a daily maximum the remainder of the year. There are 4 individual NPDES permits included in the WLA. COCs under general NPDES permits include: 182 storm water from industrial activities (MIS110000), 15 watershed-based MS4 (MIG610000), 3 jurisdictional-based MS4 (MIS040000), 1 petroleum groundwater cleanup (MIG080000), 1 noncontact cooling water (MIS110000), and 1 storm water discharge with required monitoring (MIS120000).

LAs

Because this TMDL is concentration-based, the LA is also equal to 130 *E. coli* per 100 mL as a 30-day geometric mean and 300 *E. coli* per 100 mL as a daily maximum during the recreational season and 1000 *E. coli* per 100 mL as a daily maximum year-round. This LA is based on the assumption that all land, regardless of use, will be required to meet the WQS. Therefore, the relative responsibility for achieving the necessary reductions of bacteria and maintaining acceptable conditions will be determined by the amount of land under the jurisdiction of the local unit of government in the watershed (Tables 6 and 7). Seventeen municipalities have land area within the Clinton River TMDL watershed.

MOS

This section addresses the incorporation of an MOS in the TMDL analysis. The MOS accounts for any uncertainty or lack of knowledge concerning the relationship between pollutant loading and water quality, including the pollutant decay rate, if applicable. The MOS can be either implicit (i.e., incorporated into the WLA or LA through conservative assumptions) or explicit (i.e., expressed in the TMDL as a portion of the loadings). This TMDL uses an implicit MOS because no rate of decay was used. Pathogen organisms ordinarily have a limited capability of surviving outside of their hosts and a rate of decay could be developed. However, applying a rate of decay could result in an allocation that would be greater than the WQS, thus no rate of decay is applied to provide for greater protection of water quality. The DNRE has determined that the use of the TBC WQS of 130 *E. coli* per 100 mL as a 30-day geometric mean and 300 *E. coli* per 100 mL as a daily maximum during the recreational season, and the PBC WQS of 1000 *E. coli* per 100 mL as a daily maximum year-round for the WLA and LA is a more conservative approach than developing an explicit MOS. This accounts for the uncertainty in the relationship between pollutant loading and water quality, based on available data and the assumption to not use a rate of decay. Applying the WQS to be met under all flow conditions also adds to the assurance that an explicit MOS is unnecessary.

SEASONALITY

The WQS for *E. coli* are expressed in terms of seasons, e.g., TBC from May 1 through October 31 and PBC year-round. Allocations and controls developed for the more protective

TBC season are also expected to assure attainment of the daily maximum PBC WQS of 1000 *E. coli* per 100 mL, year-round. Because this is a concentration-based TMDL, WQS must be met regardless of flow conditions in the applicable season.

REASONABLE ASSURANCE ACTIVITIES

Point Source Discharges

The permittees listed in Table 8 and Appendix 2 are responsible for meeting their NPDES permit limits. Permits for the NPDES permitted facilities that may be a source of fecal contamination contain measures to reduce or eliminate the potential for fecal contamination of the Clinton River. Michigan regulates discharges containing treated or untreated human waste (i.e., sanitary wastewater) using fecal coliform. Sanitary wastewater discharges are required to meet 200 fecal coliform per 100 mL as a monthly average and 400 fecal coliform per 100 mL as a maximum. The sanitary discharges are expected to be in compliance with the ambient PBC and TBC WQS if their NPDES permit limits for fecal coliform are met. The *E. coli* criteria contained in the USEPA's criteria document (1986) were derived to approximate the degree of protection, e.g., no more than 8 illnesses per 1000 swimmers, provided by the fecal coliform indicator level of 200 *E. coli* per 100 mL recommended by the USEPA prior to the adoption of the 1986 criteria. All WWTPs provide year-round disinfection, providing another level of confidence that the WQS for *E. coli* will be met. The individual permittees identified in Table 8 with treated human waste discharges are Mount Clemens WWTP and New Haven Schools-Ray Township. They are responsible for maintaining compliance listed with their NPDES permit limitations for fecal coliform, and to monitor their effluent according to their permit requirements.

The COCs for the general industrial storm water permit (MIS310000) listed in Appendix 2, specifies that if a TMDL is established by the Department for the receiving water that restricts the discharge of any of the identified significant materials or constituents of those materials, then the Storm Water Pollution Prevention Plan shall identify the level of control for those materials necessary to comply with the TMDL, and an estimate of the current annual load of those materials via storm water discharges to the receiving stream.

The TMDL watershed receives storm water discharges from Phase I communities, Phase II communities, and other regulated MS4s (a complete list of the regulated MS4s within the TMDL watershed is included in Table 8). These regulated MS4s are required to obtain permit coverage under Michigan's NPDES MS4 Jurisdictional-Based or Watershed-Based Storm Water General Permits. However, the Michigan Department of Transportation has a statewide NPDES Individual Storm Water Permit (MI0057364) to cover storm water discharges from their regulated MS4. Under the Jurisdictional, Watershed, and Individual MS4 permits, permittees are required to reduce the discharge of pollutants (including *E. coli*) from their MS4 to the maximum extent practicable through the development and implementation of a Public Involvement and Participation Process, a storm water-related Public Education Plan, an Illicit Discharge Elimination Program (IDEP), a post-construction Storm Water Control Program for new development and redevelopment project, a Construction Storm Water Runoff Control Program, and a Pollution Prevention/Good Housekeeping Program for municipal operations.

In particular, the IDEP and TMDL requirements of the permits have the greatest potential to contribute to the reduction of *E. coli* levels in the Clinton River. The IDEP requirements of the MS4 storm water permits require permittees to develop a program to find and eliminate illicit connections and discharges to their MS4. This includes a plan to conduct dry-weather

screening of each MS4 discharge point at least once every five years (unless an alternative schedule or approach is approved by the DNRE or the permittee opts to pursue the elective option). Dry-weather screening does not require *E. coli* sampling; however, if a permittee observes evidence of any illicit connection or discharge they are required to investigate and eliminate them. As for the TMDL requirements, permittees are required to identify and prioritize actions to be consistent with the requirements and assumptions of the TMDL. Through prioritizing TMDL actions, permittees are able to focus their efforts, which will help to make progress towards meeting Michigan's WQS.

The MS4 permit for Macomb County (MIG610052) covers all county-owned outfalls and outfalls under the nested jurisdiction of the county, including county road, county drain, and school district outfalls. The IDEP Plan for Macomb County uses a watershed approach, and coordinates the efforts of the Macomb County departments (MCHD, Public Works Office, and Road Commission), nested jurisdictions within Macomb County, watershed partner communities, and the Clinton River Watershed Council. Macomb County has been conducting IDEP activities from 2001 through 2010. Macomb County estimates that approximately 42 million gallons per year of wastewater have been excluded from the Clinton River and Lake St. Clair due to their efforts since 2003 (Macomb County, 2008). During the reporting period from October 2007 to September 2008, 163 illicit discharge investigations were conducted by Macomb County and resulted in the identification of 20 illicit discharges (14 of these were corrected during the reporting period) (Macomb County, 2008). From September 2008 through the end of 2009, the MCHD has identified an additional 20 illicit discharges of sewage (includes septic failures), 11 of which have been corrected. The MCHD also found that trash compactor leachate had been leaking into a surface water tributary (Schroeder Drain) to the Clinton River. This situation was remedied in July 2009. Trash compactor leachate can have very high *E. coli* concentrations, and therefore, eliminating this persistent source is a particularly notable accomplishment.

Each of the MS4 communities in the TMDL watershed are required to maintain their own IDEP and submit annual reports identifying actions taken to find and eliminate illicit connections, as well as identify improvements to the sanitary and storm sewers, which may indicate progress to eliminate the contamination of storm water. The minor civil divisions within Macomb County that are covered under the watershed MS4 permit (MIG61000), work together and build from the Macomb County IDEP described above; therefore, some of the information described below, from the municipality IDEPs, may be duplicate information from the Macomb County IDEP. The following IDEP information was collected from the individual IDEP progress reports from each permittee, encompassing the period from November 1, 2007, through October 31, 2008.

- Macomb, Washington, and Shelby Townships and the village of Romeo reported no suspected illicit discharges within their jurisdiction (Macomb Township, 2008; Washington Township, 2008; Shelby Township, 2008; and Village of Romeo, 2008).
- No information from this reporting period was available for Harrison Township, and the previous reporting cycle did not provide enough details to report on IDEP progress.
- Clinton Township tested outfalls in 2003 and no illicit connections were found at that time (Clinton Township, 2008).
- The city of Utica identified and corrected 1 illicit connection (laundry/sink violation) and reported that 95 percent of the city system has been inspected by the reporting date (City of Utica, 2008).

- The city of Fraser completed 70 residential, commercial, and industrial inspections, including dye testing, which resulted in the identification and correction of 2 illicit sewage discharges and numerous floor drains connected to the storm sewer (City of Fraser, 2008).
- The city of Mount Clemens identified two outfalls with evidence of illicit connections (*E. coli* concentrations in the 1000-3000 range) (City of Mount Clemens, 2008). Both of these outfall investigations are still unresolved due to difficulties in source identification.
- Chesterfield Township reported no illicit connections. In 2007/2008, the township cleaned and examined 36,000 feet of storm sewer (Chesterfield Township, 2008). Portions were replaced, and Chesterfield Township is making plans to line sections of the sanitary sewer to reduce infiltration and leaking.
- The city of Center Line initiated residential dye testing and outfall inspections with *E. coli* screening in February 2008, which resulted in the elimination of 1 illicit connection (City of Center Line, 2008). Center Line also inspected their entire storm sewer in 2005-2007, and no contamination by seepage from the sanitary sewer was noted.
- The city of Sterling Heights reported finding and correcting 1 illicit discharge and 1 OSDS violation in 2008 (City of Sterling Heights, 2008).
- The city of Warren found and corrected 9 illicit connections to the storm sewers (City of Warren, 2008).

The MS4 permit for Oakland County (MIG610042) covers all county-owned outfalls and outfalls under the nested jurisdiction of the county, including county road, county drain, and school district outfalls. Similar to the Macomb County IDEP, the IDEP Plan for Oakland County uses a watershed approach, which coordinates the efforts of the Oakland County departments, nested jurisdictions within Oakland County, and watershed partner communities via a committee called the Oakland County Stormwater Committee. Oakland County has been conducting IDEP activities from 2003 through 2010. During the reporting period of October 2007 to September 2008, dry weather IDEP surveys were conducted at 790 discharge points in 18 communities including: 144 discharge points on 105 county drains in the Rouge River and Clinton River watersheds, 193 discharge points on road commission drains in 67 subdivisions in the Clinton River watershed, and 126 discharge points at 43 county facilities (Oakland County, 2008). Oakland County eliminated 2 failed OSDS, 7 illicit connections to the storm sewer, and 3 broken sanitary lines during the 2008 reporting period, resulting in the exclusion of an estimated 7 million gallons per year of untreated sanitary waste to the Clinton River (Oakland County, 2008). None of these illicit discharges were located in the TMDL watershed, but the elimination of illicit discharges within the Clinton River, upstream of the TMDL reach, directly benefits the TMDL reach. The following IDEP information was collected from the individual IDEP progress reports from each permittee, encompassing the period from November 1, 2007 through October 31, 2008:

- The city of Rochester replaced approximately 17,000 linear feet of sanitary sewer and 92 storm sewer structures in order to minimize infiltration (City of Rochester, 2008). The city of Rochester did not find any suspicious outfalls during a dry weather survey of outfalls in 2007.
- The city of Rochester Hills reported no suspected illicit discharges within their jurisdiction (City of Rochester Hills, 2008).

At the time of the Section 303(d) listing of the Clinton River in 1998, the city of Pontiac (upstream of the listed reach) was discharging untreated sewage to the Clinton River through

combined sewer overflows (CSOs). Pontiac has completely separated their storm and sanitary sewers, and therefore, no longer has CSOs. While the CSOs have been eliminated, the Pontiac WWTP is prone to chronic SSOs and is under a consent order to eliminate these by 2020. There are no uncontrolled CSOs in the TMDL watershed. Chronic SSOs represent a significant source of fecal contamination, and therefore, *E. coli* to the Clinton River TMDL watershed. The three municipalities that are responsible for SSOs in the TMDL watershed (Clinton Township and the cities of Center Line and Fraser) are all under Administrative Consent Order to fix the discharges. The city of Centerline's SSO remedy is under construction and the SSO will be eliminated by the end of 2011. Clinton Township is required to correct their SSOs by the end of 2011, leaving only one emergency SSO outfall, which can only be used during storms above specified magnitude (approved by the DNRE). The city of Fraser will have eliminated their chronic SSO by June of 2010. The elimination of chronic SSOs that affect the Clinton River TMDL area will help to attain the TBC and PBC WQS.

Nonpoint Source Activities

The MCHD has a Point of Sale Ordinance, which requires the inspection of OSDS prior to property transfer, and requires the remediation of failing systems. Owners of systems that are found to be failing have 180 days to correct the problem after the submission of a corrective action plan to the MCHD. The MCHD responded to 77 complaints resulting in the correction of 19 violations in 2008, and issued 195 OSDS repair permits in 2008 (Macomb County, 2008). Oakland County does not have a Point of Sale Ordinance, but the Oakland County Health Department responded to 129 complaints of failing systems and issued 449 permits for the installation of new or replacement systems during 2008 (Oakland County, 2008). Failing OSDS have the potential to contaminate ground and surface water; therefore, the repair of failing systems is critical to reducing *E. coli* in the Clinton River TMDL watershed.

Watershed Management Plans (WMPs) have been developed for Clinton River East, Stony Creek, and Red Run Drain subwatersheds. These plans were a joint effort between Macomb County, its nested jurisdictions, cities, and townships and the Clinton River Watershed Council. The Watershed Management Plans identify a plan of action to meet all WQS within the watershed to remediate threatened and impaired water bodies, while improving water quality in all water bodies. Reducing pathogens and meeting the *E. coli* WQS in Clinton River are listed as goals in these Watershed Management Plans. In 2008, the Macomb County Public Works Office was awarded a Federal CWA Section 319 grant to develop a Watershed Management Plan for the North Branch Clinton River. This Watershed Management Plan is currently being developed with a target completion date of July 31, 2010. A major aspect of this project involves modeling different land management scenarios to predict future pollutant loadings in the watershed.

The MCHD has been awarded a Clean Michigan Initiative-Clean Water Fund grant titled, "Facility Dye Testing Project – Phase III." The grant was awarded in 2009 and work is scheduled to be completed in 2011. This project will improve the quality of storm water by eliminating illicit connections that have been identified during dye testing of industrial, commercial, and institutional facilities located in Sterling Heights and Clinton Township. Another Clean Michigan Initiative grant titled, "IDEP City of Mount Clemens," was awarded to the city of Mount Clemens WWTP. The goal of this project was to lower bacterial contamination in the Clinton River through identification and elimination of illicit connections within the city of Mount Clemens. This project was completed in December 2009, and resulted in the elimination of two illicit connections to the storm system, and the identification of an additional illicit connection, which is in the enforcement phase. Also, as part of this project, five

additional outfalls were cleaned and resampled. The total estimated dry weather daily reduction in fecal coliform from this IDEP project is 655,559,996 counts per 100 mL, or a 77 percent estimated reduction.

Other Reasonable Assurance Activities

The entire Clinton River watershed is designated as a Great Lakes Area of Concern. The lower section of the river was first designated by the International Joint Commission in 1985 and was then expanded to the entire basin in 1995. Part of the reason for the Area of Concern designation was the concern for high bacterial counts entering Lake St. Clair from CSOs in the watershed. In 1985, the Remedial Action Plan was developed by the DNRE listing beach closings as a beneficial use impairment. The goal of the Remedial Action Plan is to identify environmental problems, establish water use goals, and provide cleanup solutions that will restore the Area of Concern's beneficial uses. In 1998, the Remedial Action Plan was updated and identified fecal contamination due to failing septic tanks and illicit connections to storm sewers, and the contamination of storm water surface runoff as pollution concerns that remained for the Area of Concern. The 1998 Remedial Action Plan also acknowledged pollution cleanup efforts, specifically, the elimination of uncontrolled CSOs in Mount Clemens and the reduction in the number of SSOs. The Public Advisory Committee set restoration goals for the beach closing impairment in 2007. The designation of the Clinton River as an Area of Concern gives priority to planning and implementation projects in the watershed for funding through sources such as the Great Lakes Restoration Initiative and Section 319 federal funds.

The Clinton River is part of the Adopt-A-Stream Program, implemented by The Clinton River Watershed Council. The Adopt-A-Stream Program monitors water quality throughout the Clinton River watershed. This program does not specifically monitor for *E. coli*, but distributes educational materials and promotes a sense of public and personal responsibility to maintain water quality. Other volunteer actions include promoting proper lawn care, pet waste cleanup, investigating pollution sources, education, and land use planning.

The Blue Ribbon Commission on Lake St. Clair was established in 1997 by Macomb County. This commission determined four key elements that are required to manage water quality issues affecting Lake St. Clair. These include monitoring, education, voluntary action, and regulation and enforcement. The commission also recommended various actions at watershed, local, state, national, and international levels that should be taken to support the four key elements (MCHD, 1997). The recommendations of the commission resulted in the creation of the Lake St. Clair Regional Monitoring Project (Project). The Project was a joint effort between county governments in southeast Michigan (Macomb, Oakland, Wayne, and St. Clair Counties), the DNRE, and the USGS. Water quality data, including *E. coli*, were collected during 2004 and 2005 at 75 previously unsampled locations (including 20 sites on the Clinton River) and is available on the Internet to aid in source assessment and the improvement of water quality. The Project includes a Web site (www.lakestclairdata.net) and the embedded database, which is intended to be "used for making decisions on prevention strategies and on priorities for remediation and for the protection of public health." The final report, which contains information on sediment and pollutant loads and identifies data gaps for Lake St. Clair tributaries, was published online in September 2007 (Fogarty, 2007). Data and conclusions from the Project have guided, and will continue to guide, community leaders in targeting improvements in the Clinton River watershed to meet the goal of WQS attainment. Also, following the recommendations of the Blue Ribbon Committee, the MCHD has led a monitoring effort, beginning in 1998, where samples are collected once per week and tested for

E. coli at 50 sites throughout the Macomb County portion of the Clinton River watershed. Samples are also collected at selected sites in response to rainfall events, especially in areas where SSOs have occurred or are anticipated. The data collected is entered into a database and is reviewed closely for trends that might indicate problems requiring further investigation and for reductions in pollution levels that result from corrective efforts.

MONITORING

Future monitoring by the DNRE will take place as part of the five-year rotating basin monitoring, as resources allow, once actions have occurred to address sources of *E. coli.* When these results indicate that the water body may be meeting WQS, sampling will be conducted at the appropriate frequency to determine if the 30-day geometric mean value of 130 *E. coli* per 100 ml and daily maximum values of 300 *E. coli* per 100 ml and 1000 *E. coli* per 100 ml are being met.

The MCHD plans to continue their weekly and wet weather targeted surface water *E. coli* monitoring as their resources allow.

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May 11, 2010

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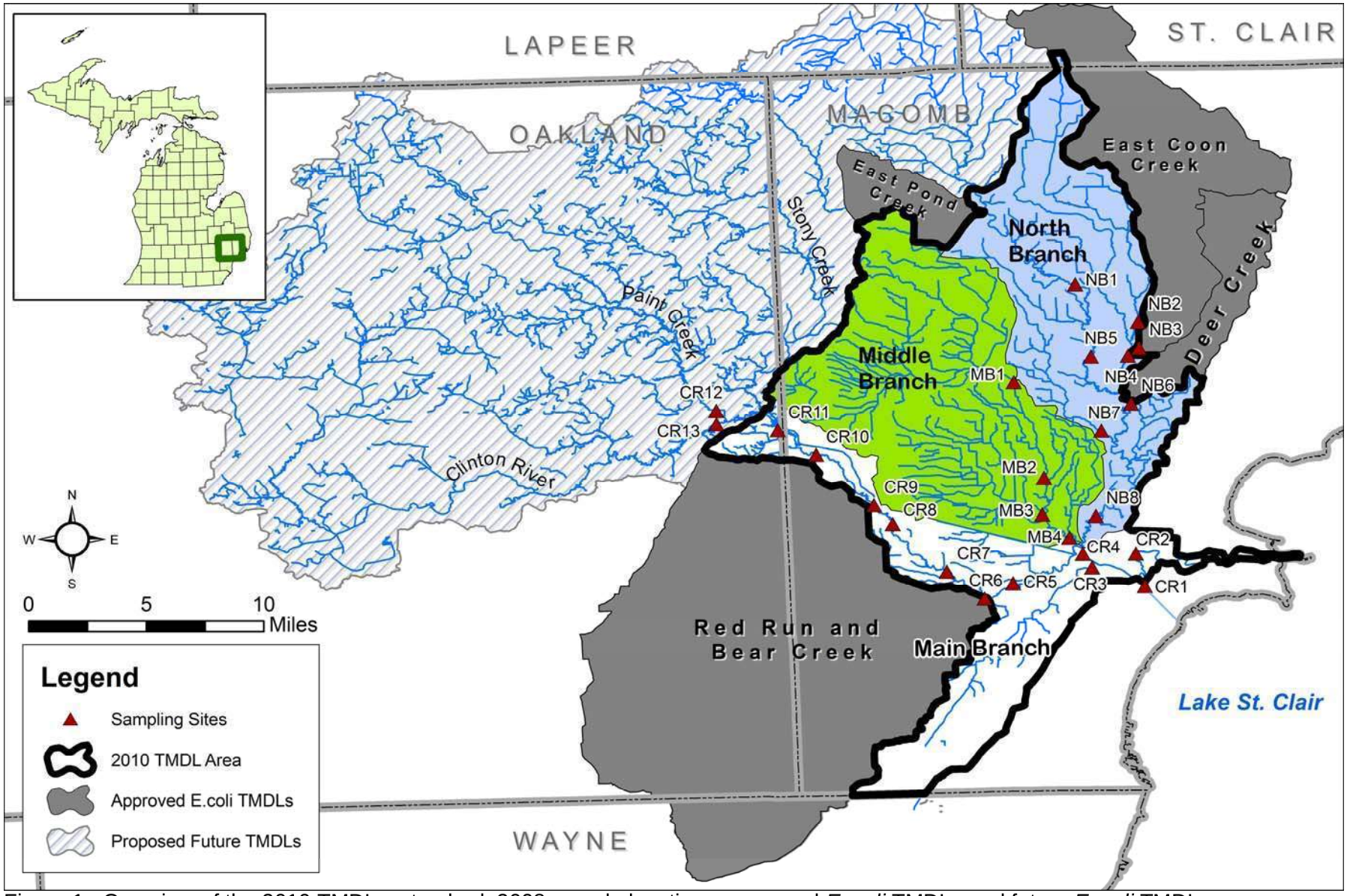


Figure 1. Overview of the 2010 TMDL watershed, 2008 sample locations, approved *E. coli* TMDLs and future *E. coli* TMDL areas.

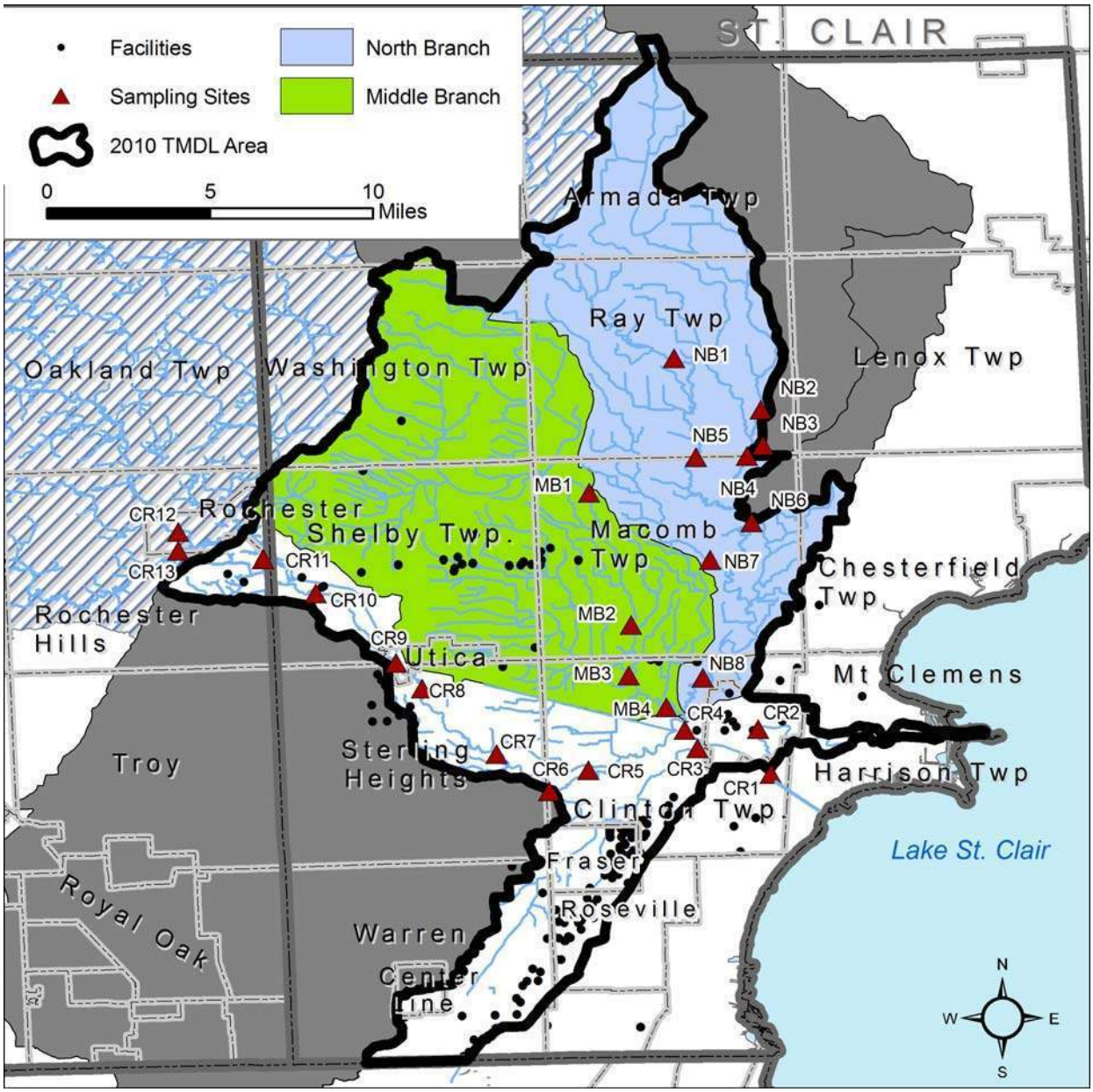


Figure 2. Locations of sampling stations, NPDES permitted discharges, and municipalities within the TMDL watershed.

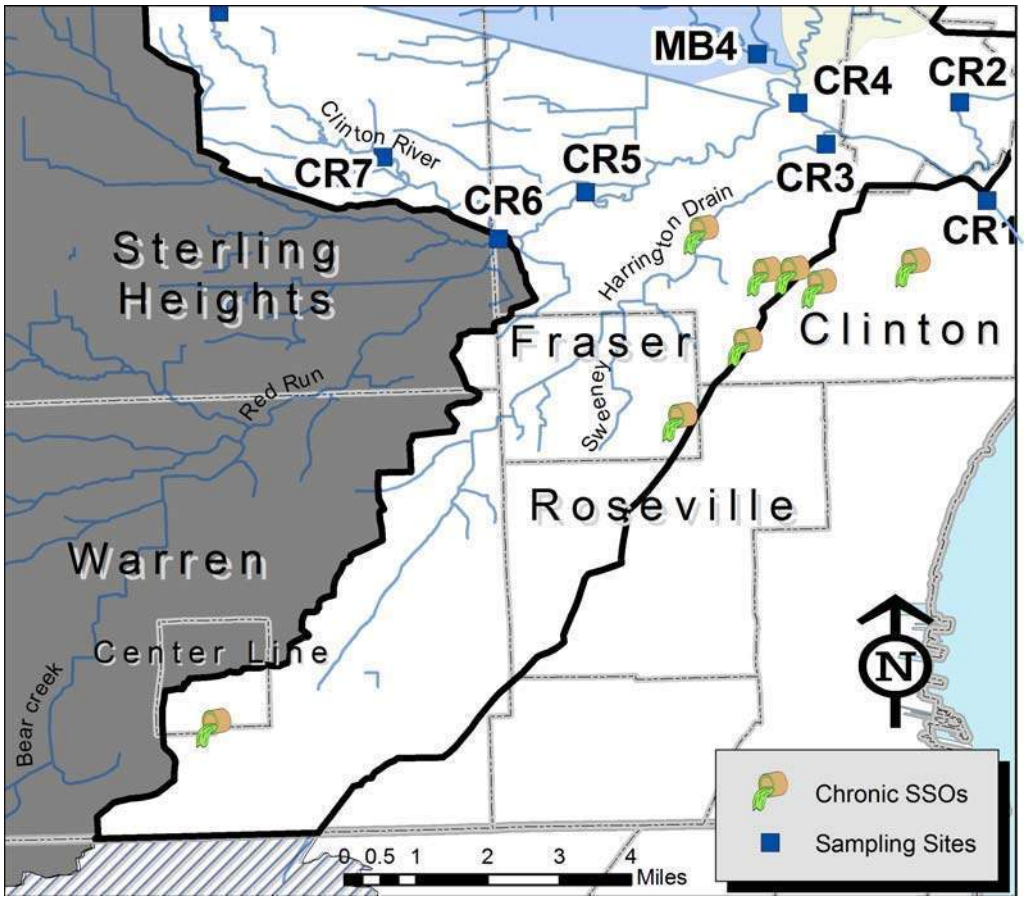


Figure 3. Map of chronic SSOs (under the jurisdictions of Center Line, Fraser, and Clinton Townships) in relation to DNRE sampling stations.

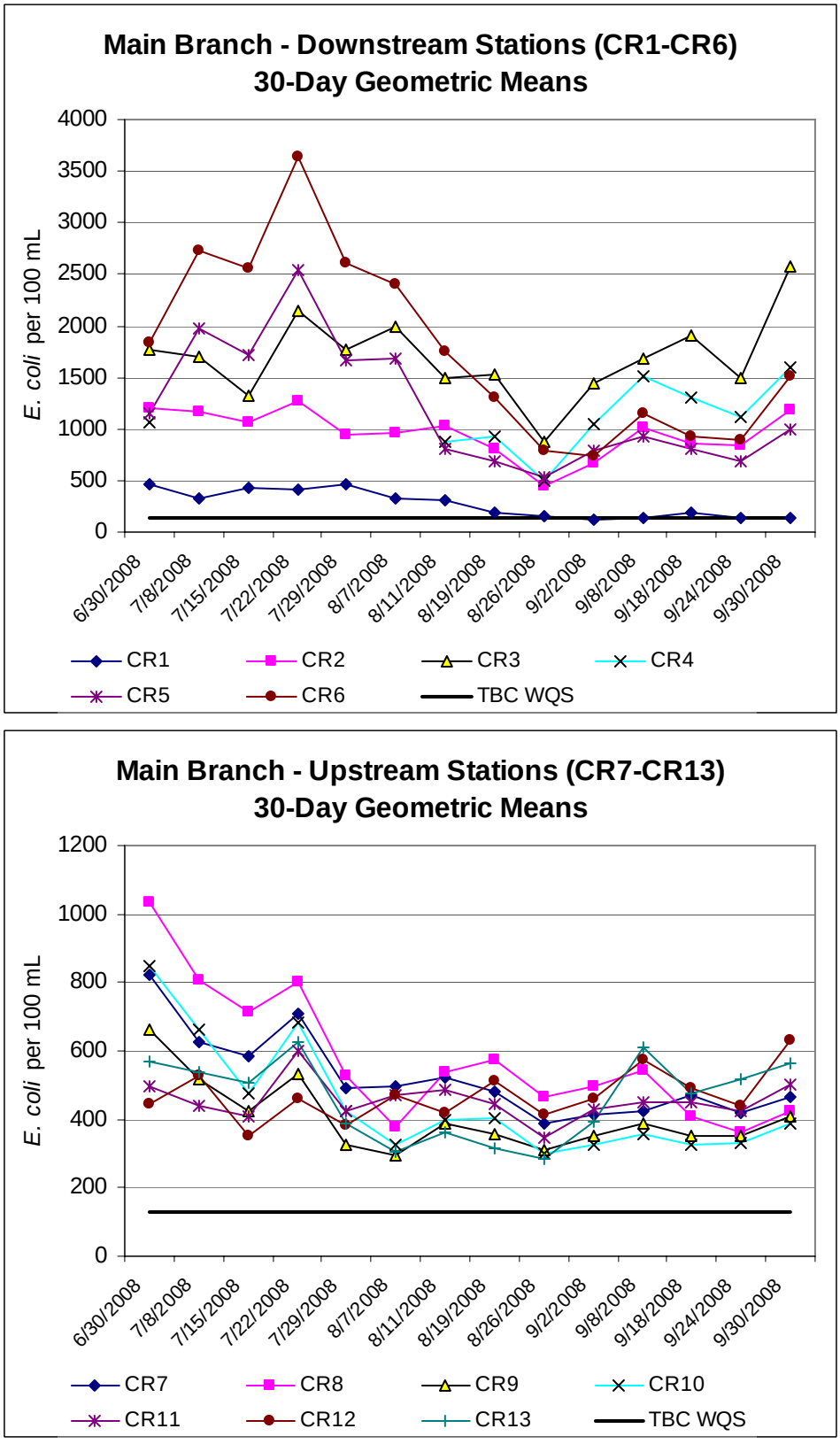


Figure 4. Thirty-day geometric mean *E. coli* sampling results from the Main Branch Clinton River (Stations CR1-CR13) in relation to the TBC WQS of 130 *E. coli* per 100 mL as a 30-day geometric mean.

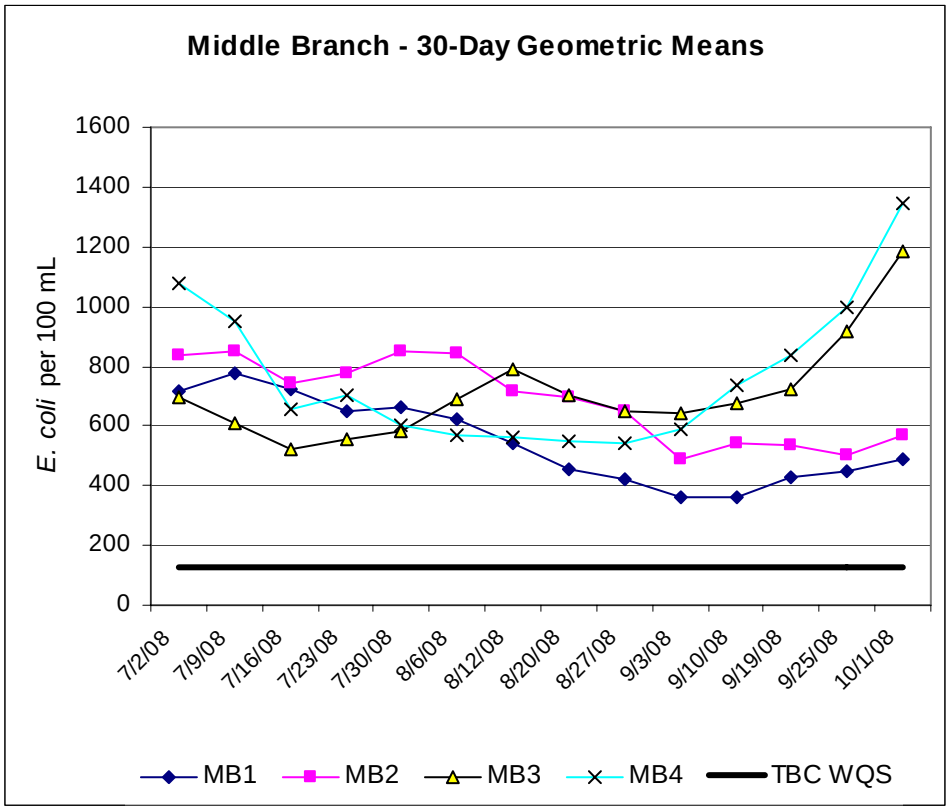


Figure 5. Thirty-day geometric mean *E. coli* sampling results from the Middle Branch Clinton River (Stations MB1-MB4) in relation to the TBC WQS of 130 *E. coli* per 100 mL as a 30-day geometric mean.

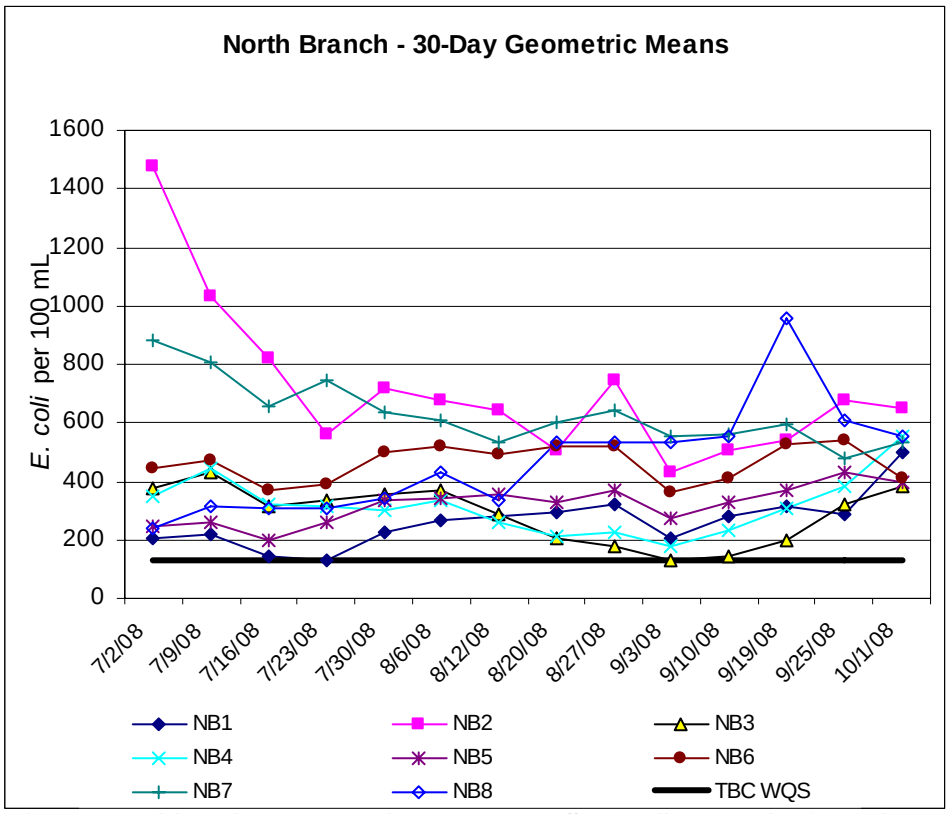


Figure 6. Thirty-day geometric mean *E. coli* sampling results from the North Branch Clinton River (Stations NB1-NB8) in relation to the TBC WQS of 130 *E. coli* per 100 mL as a 30-day geometric mean.

Table 1. Weekly *E. coli* sampling results (counts per 100 mL) from the North Branch Clinton River (Stations NB1-NB8); June 5-October 1, 2008. Exceedances of the TBC WQS are shaded gray and PBC exceedances are outlined in bold.

	NB1					NB2					NB3					NB4					
	N. Br. Clinton at 29-Mile					Coon creek at North Rd.					E. Br. Coon Creek at 29-Mile					Coon creek at 26-Mile					
Sample Date	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	2-day prior precip. (Romeo, MI)
6/5/2008	60	160	160	115		1000	4000	1940	1980		240	200	60	142		140	180	120	145		0.24
6/11/2008	1580	1200	1600	1448		2800	3200	2200	2701		1520	3200	1600	1982		1600	1600	1400	1530		0.65
6/19/2008	300	100	140	161		560	1000	2600	1133		240	260	100	184		180	160	100	142		0.07
6/25/2008	100	60	140	94		1000	1280	1200	1154		480	900	300	506		640	600	560	599		0.15
7/2/2008	200	200	60	134	202	700	1200	1200	1003	1476	600	200	200	288	377	200	240	400	268	347	0
7/9/2008	220	140	180	177	221	200	400	440	328	1030	800	80	340	279	431	360	520	660	498	445	0
7/16/2008	200	240	120	179	145	260	1400	1800	869	821	280	480	500	407	314	320	380	240	308	323	0
7/23/2008	120	100	60	90	129	220	200	100	164	558	300	300	200	262	337	160	140	100	131	317	0
7/30/2008	2200	1400	1200	1546	226	7800	2200	4000	4094	719	600	820	520	635	353	300	460	800	480	304	0.29
8/6/2008	400	400	160	295	265	560	1200	600	739	676	460	500	200	358	368	600	260	600	454	337	0
8/12/2008	300	260	180	241	281	160	300	340	254	642	80	60	120	83	289	140	120	140	133	259	0
8/20/2008	220	140	320	214	292	120	600	240	259	504	60	<20	80	69	203	120	100	120	113	212	0
8/27/2008	140	120	200	150	323	320	2600	1800	1144	743	140	140	140	140	179	180	160	200	179	226	0
9/3/2008	180	200	140	171	208	240	380	220	272	432	120	120	140	126	130	200	140	100	141	177	0
9/10/2008	1000	1800	1400	1361	283	1800	1200	2000	1629	506	580	740	600	636	145	2000	1400	1800	1715	230	1.1
9/19/2008	380	160	1000	393	312	140	560	600	361	543	760	480	200	418	201	1000	400	400	543	305	0
9/25/2008	200	140	100	141	287	1200	1000	380	770	676	400	1600	600	727	321	480	260	320	342	381	0
10/1/2008	2000	1600	4400	2415	500	800	1000	1000	928	648	260	480	320	342	384	2400	820	780	1154	553	0.14

Table 1 (continued). Weekly *E. coli* sampling results (counts per 100 mL) from the North Branch Clinton River (Stations NB1-NB8); June 5-October 1, 2008. Exceedances of the TBC WQS are shaded gray and PBC exceedances are outlined in bold.

	NB5					NMB6					NB7					NB8					
	N. Br. Clinton at 26-Mile					N. Br. Clinton at 24-Mile					Mcbride Drain at Card Rd.					N. Br. Clinton at end of Dunham					
Sample Date	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	2-day prior precip. (Romeo, MI)
6/5/2008	280	200	240	237		280	400	200	335		1140	1020	980	1078		80	120	200	98		0.24
6/11/2008	1200	1200	1200	1200		600	3000	1200	1342		1400	2200	2400	1755		380	360	1200	370		0.65
6/19/2008	40	60	60	49		120	340	200	202		60	400	400	155		420	360	100	389		0.07
6/25/2008	180	400	240	268		560	400	460	473		3200	5000	2800	4000		260	200	300	228		0.15
7/2/2008	240	200	220	255	249	240	380	460	402	444	1000	220	2000	461	884	140	140	160	254	241	0
7/9/2008	580	100	280	295	260	540	200	400	438	469	800	820	1020	675	805	160	400	160	378	316	0
7/16/2008	240	420	240	319	200	260	320	80	392	366	1200	600	1200	641	658	160	280	220	322	307	0
7/23/2008	180	100	160	179	259	180	180	140	276	390	200	300	200	286	744	220	320	140	379	306	0
7/30/2008	1600	2000	1800	990	336	3000	2000	2400	1585	496	3400	3800	4000	1858	638	100	800	800	408	344	0.29
8/6/2008	360	200	160	290	344	500	440	800	515	521	240	400	400	369	610	1000	620	580	805	433	0
8/12/2008	420	400	280	352	356	240	280	260	332	493	240	360	420	349	535	40	40	140	105	335	0
8/20/2008	160	240	560	201	325	520	500	300	492	516	1600	1800	1000	1141	600	8200	6600	7200	3349	535	0
8/27/2008	600	280	220	336	369	260	220	240	288	521	600	220	200	410	645	260	340	400	385	536	0
9/3/2008	280	240	600	228	275	300	160	200	258	362	1400	1200	1000	848	552	200	600	180	389	531	0
9/10/2008	1800	860	340	709	329	1800	1400	1000	968	411	740	200	1600	393	559	1200	1400	1600	970	551	1.1
9/19/2008	1500	540	720	628	369	1500	2500	2500	1174	530	1600	120	200	467	592	3500	2400	3000	1648	957	0
9/25/2008	800	260	280	430	430	600	600	300	544	540	340	340	400	397	479	560	160	600	356	611	0
10/1/2008	160	140	200	231	399	20	40	200	73	410	1000	800	860	690	532	160	140	60	233	553	0.14

Table 2. Weekly *E. coli* sampling results (counts per 100 mL) from the Main Branch Clinton River (Stations CR1-CR13); June 3-September 30, 2008. Exceedances of the TBC WQS are shaded gray and PBC exceedances are outlined in bold.

	CR1					CR2					CR3					CR4					
	Clinton River Spillway at Harper Rd.					Main Br. Clinton at Crocker Blvd.					Harrington Drain at Harrington Rd.					Main Br. Clinton at Moravian Rd.					
Sample Date	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	2-day prior precip. (Pontiac WWTP, MI)
6/4/2008	1200	1040	1000	1077		1600	1800	3800	2220		3200	4400	4800	4073		800	600	1000	783		0.48
6/9/2008	600	200	400	363		3000	1200	1000	1533		4500	3500	3500	3806		1600	2400	3200	2308		0.63
6/18/2008	1000	760	1400	1021		2400	860	1200	1353		1200	380	1000	770		1800	440	1000	925		0.04
6/24/2008	160	120	120	132		440	1800	2200	1203		1200	1600	2000	1566		1800	1800	600	1248		0.21
6/30/2008	480	400	440	439	471	540	400	440	456	1204	780	760	1400	940	1774	800	520	600	630	1056	0.06
7/8/2008	220	120	180	168	325	560	2600	4800	1912	1168	2000	8800	2000	3277	1698	ns	ns	ns	ns	na	0.09
7/15/2008	280	1400	10200	1587	436	1000	1000	860	951	1062	1400	1200	800	1104	1326	400	320	520	405	na	0
7/22/2008	580	540	1320	745	410	3200	1400	8400	3351	1273	12200	7200	6800	8422	2139	5600	8200	7400	6978	na	0.73
7/29/2008	160	280	400	262	470	240	180	400	259	936	800	480	560	599	1765	300	300	800	416	na	0
8/7/2008	180	100	20	71	326	500	800	360	524	962	3600	1000	1400	1715	1991	80	580	380	260	na	0
8/11/2008	40	210	200	119	304	2400	2400	3800	2797	1039	760	840	700	765	1488	1000	2000	2200	1639	*871*	0.34
8/19/2008	180	200	160	179	197	200	220	380	256	799	1060	1200	1600	1267	1530	600	560	460	537	921	0
8/26/2008	180	200	140	171	147	200	200	180	193	451	500	400	740	529	880	440	220	280	300	491	0
9/2/2008	140	40	140	92	119	960	380	17400	1852	669	12600	2800	9400	6922	1435	20600	18200	17000	18541	1050	0
9/8/2008	260	80	140	143	137	4800	4600	3000	4046	1007	3000	3800	4800	3796	1682	1000	1600	2600	1608	1511	0.26
9/18/2008	800	200	800	504	183	420	<20	3500	1212	852	2000	1400	1000	1409	1901	1400	560	600	778	1302	0
9/24/2008	20	60	100	49	141	180	340	200	230	834	560	200	500	383	1496	180	260	360	256	1123	0
9/30/2008	60	200	180	129	133	1020	1460	980	1134	1189	1800	17400	15800	7910	2570	1000	1600	3200	1724	1593	0.07

Table 2 (continued). Weekly *E. coli* sampling results (counts per 100 mL) from the Main Branch Clinton River (Stations CR1-CR13); June 4-September 30, 2008. Exceedances of the TBC WQS are shaded gray and PBC exceedances are outlined in bold.

	CR5					CR6					CR7					CR8					
	Main Br. Clinton at Garfield Rd.					Red Run Drain at Utica Rd.					Main Br. Clinton at Schoenner Rd.					Main Br. Clinton at Riverland Rd.					
Sample Date	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	2-day prior precip. (Pontiac WWTP, MI)
6/4/2008	1000	3000	3400	2169		1200	1400	1400	1330		1400	1400	1600	1464		800	800	1600	1008		0.48
6/9/2008	3500	1800	1600	2160		4500	3400	1200	2638		800	600	400	577		600	200	600	416		0.63
6/18/2008	420	400	500	438		2000	2000	2400	2125		600	860	480	628		2400	780	1000	1232		0.04
6/24/2008	2200	4200	2000	2644		3200	2600	3400	3047		1600	2200	1000	1521		2200	2000	1200	1741		0.21
6/30/2008	400	300	460	381	1156	1000	1000	820	936	1843	500	500	400	464	822	1200	1200	1600	1321	1035	0.06
7/8/2008	10000	52000	64000	32166	1983	10500	11800	6600	9351	2722	400	420	300	369	624	320	220	360	294	809	0.09
7/15/2008	1000	1500	740	1035	1711	4000	2800	660	1948	2562	360	340	600	419	585	600	100	180	221	713	0
7/22/2008	1000	4200	7800	3200	2547	13400	14800	9600	12394	3646	1800	1000	2400	1629	708	1640	3200	2040	2204	801	0.73
7/29/2008	220	400	360	316	1666	580	500	640	570	2608	220	320	220	249	493	260	200	200	218	529	0
8/7/2008	360	440	400	399	1681	1200	500	400	621	2402	360	800	400	487	498	360	220	200	251	379	0
8/11/2008	800	800	940	844	812	2800	2000	1200	1887	1744	300	600	600	476	524	1000	1600	2800	1649	535	0.34
8/19/2008	500	600	360	476	695	480	460	400	445	1299	180	380	320	280	483	500	240	240	307	572	0
8/26/2008	600	1200	1000	896	539	1600	1000	800	1086	798	360	600	740	543	388	800	1600	400	800	467	0
9/2/2008	3000	9400	380	2205	795	280	440	440	378	735	240	460	380	347	414	180	400	340	290	494	0
9/8/2008	660	780	1400	897	934	7400	6200	4600	5954	1155	620	560	500	558	426	560	440	280	410	545	0.26
9/18/2008	1500	200	200	391	801	1200	480	400	613	922	400	1200	1000	783	470	220	460	540	379	406	0
9/24/2008	160	260	260	221	687	480	440	240	370	889	180	120	180	157	419	200	140	180	171	362	0
9/30/2008	8800	10600	2000	5714	996	13600	14200	18400	15260	1508	860	600	1600	938	468	3000	2400	820	1807	426	0.07

Table 2 (continued). Weekly *E. coli* sampling results (counts per 100 mL) from the Main Branch Clinton River (Stations CR1-CR13); June 4-September 30, 2008. Exceedances of the TBC WQS are shaded gray and PBC exceedances are outlined in bold.

	CR9					CR10					CR11					CR12					CR13					
	Main Br. Clinton at Auburn Rd.					Main Br. Clinton at Ryan Rd.					Main Br. Clinton at Dequidre Rd					Paint Creek at Rochester Rd.					Main Br. Clinton at Diversion St.					
Sample Date	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	2-day prior precip. (Pontiac WWTP, MI)
6/4/2008	600	1200	800	832		1200	800	600	832		800	1200	840	931		400	500	400	431		600	400	660	541		0.48
6/9/2008	400	1200	600	660		2500	200	1000	794		400	1200	400	577		800	2000	600	986		1000	400	400	543		0.63
6/18/2008	240	400	360	326		540	400	180	339		160	180	400	226		140	120	400	189		120	200	820	270		0.04
6/24/2008	1800	3200	800	1664		2400	800	6200	2283		1200	1600	1400	1390		1040	1200	1000	1077		1600	1400	1400	1464		0.21
6/30/2008	200	1000	400	431	663	400	1000	1600	862	849	160	200	180	179	497	200	220	180	199	444	520	460	600	524	571	0.06
7/8/2008	280	80	600	238	516	400	600	60	243	664	600	540	380	497	438	860	1340	880	1005	526	240	600	420	393	536	0.09
7/15/2008	120	600	220	251	425	160	220	100	152	477	260	800	320	405	408	160	100	160	137	354	360	360	580	422	509	0
7/22/2008	1000	1200	800	986	531	3800	1800	1200	2017	681	1000	3000	1200	1533	599	660	740	740	712	462	600	600	1200	756	626	0.73
7/29/2008	120	200	140	150	328	400	160	140	208	422	240	220	280	245	423	560	420	320	422	383	220	140	80	135	389	0
8/7/2008	180	220	380	247	294	200	240	300	243	328	440	180	380	311	473	780	540	440	570	473	140	180	160	159	306	0
8/11/2008	1800	600	780	944	387	1400	520	360	640	397	700	600	420	561	484	520	600	560	559	420	1200	880	740	921	363	0.34
8/19/2008	120	260	160	171	358	120	140	240	159	401	500	160	240	268	446	380	460	280	366	512	200	180	260	211	316	0
8/26/2008	300	1000	400	493	312	300	460	800	480	301	340	400	600	434	346	240	260	220	239	411	400	440	480	439	283	0
9/2/2008	340	280	220	276	352	180	360	500	319	328	740	400	1200	708	428	900	780	600	750	461	2400	280	480	686	392	0
9/8/2008	400	400	420	407	389	340	400	400	379	358	340	500	380	401	450	1200	1800	2200	1681	573	1600	2400	800	1454	611	0.26
9/18/2008	580	800	420	580	353	360	280	600	393	325	560	480	600	544	448	260	200	340	261	492	800	120	200	268	477	0
9/24/2008	140	160	200	165	350	140	200	180	171	330	180	220	200	199	422	240	200	180	205	438	240	560	220	309	515	0
9/30/2008	540	1200	1800	1053	408	2200	1200	500	1097	389	1100	1060	880	1009	500	680	2200	2200	1487	631	1000	400	800	684	563	0.07

Table 3. Weekly *E. coli* sampling results (counts per 100 mL) from the Middle Branch Clinton River (Stations MB1-MB4); June 5-October 1, 2008. Exceedances of the TBC WQS are shaded gray and PBC exceedances are outlined in bold.

	MB1					MB2					MB3					MB4					
	Middle Br. Clinton at 25-Mile					Middle Br. Clinton at 21-Mile					Gloede Dr. at Romeo Plank rd.					Middle Br. Clinton at Heydenreich					
	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	Left	Center	Right	Daily Max	30-Day Geomean	2-day prior precip. (Romeo, MI)
6/5/2008	460	380	60	418		860	440	600	615		1200	600	1000	849		1400	1400	1000	1400		0.24
6/11/2008	960	920	1000	940		2200	1600	2400	1876		600	2400	2000	1200		3200	2800	2400	2993		0.65
6/19/2008	800	1000	360	894		520	500	340	510		720	820	400	768		500	540	720	520		0.07
6/25/2008	1000	800	800	894		700	880	800	785		800	240	560	438		660	1000	500	812		0.15
7/2/2008	1400	600	800	593	715	600	1300	680	883	836	600	740	1000	475	696	800	1000	700	823	1078	0
7/9/2008	800	1200	1080	630	776	400	880	860	657	847	460	620	600	448	612	940	720	620	746	950	0
7/16/2008	1400	1000	600	654	721	1000	1400	800	973	743	1400	340	1000	527	519	400	520	640	476	658	0
7/23/2008	900	600	600	519	647	700	480	600	630	775	2000	2200	1400	1104	558	640	1000	1600	710	700	0
7/30/2008	2800	1120	1280	1017	664	2800	1120	1280	1260	852	600	800	820	548	584	380	240	340	376	600	0.29
8/6/2008	1000	220	340	423	620	960	1000	1200	837	843	1600	2000	1800	1115	693	600	600	780	629	569	0
8/12/2008	360	260	520	322	543	200	220	400	287	714	1600	1200	2600	863	790	400	1200	1000	724	566	0
8/20/2008	220	300	380	278	457	220	4600	4000	847	694	300	160	380	295	703	300	340	280	415	550	0
8/27/2008	260	400	160	337	419	220	600	600	440	646	780	920	800	727	647	800	580	440	670	544	0
9/3/2008	680	560	200	471	360	200	300	340	321	492	500	600	600	542	645	580	440	440	548	587	0
9/10/2008	600	380	560	422	359	3000	1600	2000	1389	544	2000	2400	2600	1383	674	3000	3600	2400	1938	735	1.1
9/19/2008	1400	1000	800	803	431	180	160	3000	257	532	2000	1000	1400	1242	725	2500	1400	1200	1364	834	0
9/25/2008	300	280	480	330	447	840	640	100	636	503	1400	1000	1600	949	915	1000	1200	900	1032	1000	0
10/1/2008	560	600	680	512	486	1600	600	580	799	567	5200	6400	5400	2640	1185	4200	5200	5400	2958	1346	0.14

Table 4. Summary of data for all stations, including station geometric means, the number of PBC and daily maximum TBC WQS exceedances, and the results of bacterial source tracking at selected stations (+ indicates that the biomarker was detected; - indicates that no biomarker was detected). Station NB2 was sampled for Bacterial Source Tracking on two dates with mixed results.

Station ID	Sample Location	Number of PBC WQS exceedances	Number of TBC WQS exceedances	Station geometric mean	Cattle bacteroidetes biomarker	Human bacteroidetes biomarker
CR1	Clinton River Spillway at Harper Road	3	7	249		
CR2	Main Br. Clinton River at Crocker Blvd.	11	14	975		
CR3	Harrington Drain at Harrington Rd.	11	18	1778	-	+
CR4	Main Br. Clinton River at Moravian Rd	7	15	1005		
CR5	Main Br. Clinton River at Garfield Rd	8	17	1135		
CR6	Red Run Drain at Utica Rd.	11	18	1686		
CR7	Main Br. Clinton River at Schoenner Rd.	3	15	546		
CR8	Main Br. Clinton River at Riverland Rd.	7	12	579		
CR9	Main Br. Clinton River at Auburn Rd.	2	11	430		
CR10	Main Br. Clinton River at Ryan Rd.	3	12	456		
CR11	Main Br. Clinton River at Dequindre Rd.	3	5	474		
CR12	Paint Creek at Rochester Rd.	4	6	482	-	+
CR13	Main Br. Clinton River at Diversion St.	2	5	458		
MB1	Middle Br. Clinton River at 25 Mile	1	17	582		
MB2	Middle Br. Clinton River at 21 Mile	3	16	729		
MB3	Gloede Drain at Romeo Plank Rd..	6	17	1024	-	+
MB4	Middle Br. Clinton River at Heydenreich Rd.	6	18	900		
NB1	North Br. Clinton River at 29 Mile	4	5	279		
NB2	Coon Creek at North Rd.	8	14	767	+-	-+
NB3	East Br. Coon Creek at 26 Mile Rd.	1	8	306		
NB4	Coon Creek at 26 Mile Rd.	3	10	337		
NB5	North Br. Clinton River at 26 Mile	1	8	326		
NB6	North Br. Clinton River at 24 Mile.	2	13	402		
NB7	McBride Drain at Card Rd.	5	16	725	+	+
NB8	North Br. Clinton River at end of Dunham Rd	2	13	363		

Table 5. 2006 Land Cover Classification of the entire TMDL watershed and the Main Branch, Middle Branch, and North Branch Clinton River (separately) as a percent of total land area.

2006 Land Cover Classification	Entire TMDL Watershed	Main Branch	Middle Branch	North Branch
Developed, High Intensity	5%	12%	4%	1%
Developed, Medium Intensity	17%	34%	18%	2%
Developed, Low Intensity	19%	27%	25%	6%
Developed, Open Space	10%	11%	14%	5%
Cultivated Crops	16%	0%	10%	37%
Pasture/Hay	8%	0%	6%	17%
Grassland/Herbaceous	1%	0%	1%	2%
Deciduous Forest	13%	7%	14%	17%
Evergreen Forest	1%	1%	1%	1%
Mixed Forest	1%	1%	1%	1%
Scrub/Shrub	1%	0%	1%	2%
Palustrine Forested Wetland	5%	4%	3%	7%
Palustrine Scrub/Shrub Wetland	1%	0%	1%	2%
Palustrine Emergent Wetland	1%	1%	1%	1%
Bare Land	1%	0%	1%	1%

Table 6. Percent of land area in the Lower Clinton River TMDL watershed located within each municipality. Municipalities that hold an MS4 permit are marked with an “X.”

Municipality Name	County	Percent of TMDL Watershed	MS4 community
Armada Twp	Macomb	8%	
Center Line	Macomb	<1%	X
Chesterfield Twp	Macomb	<1%	X
Clinton Twp	Macomb	10%	X
Fraser	Macomb	2%	X
Harrison Twp	Macomb	<1%	X
Macomb Twp	Macomb	17%	X
Mt Clemens	Macomb	2%	X
Ray Twp	Macomb	17%	
Rochester	Oakland	<1%	X
Rochester Hills	Oakland	2%	X
Roseville	Macomb	1%	X
Shelby Twp	Macomb	16%	X
Sterling Heights	Macomb	5%	X
Utica	Macomb	<1%	X
Warren	Macomb	6%	X
Washington Twp	Macomb	11%	X

Table 7. Percent of land area in the Lower Clinton River TMDL watershed located within each county. Counties that hold an MS4 permit are marked with an ”X.”

County	Percent of TMDL Watershed	MS4 community
Macomb	91%	X
Oakland	1%	X
St. Clair	<1%	X

Table 8. NPDES facilities discharging to the Clinton River watershed. COCs under the General Storm Water Permit are listed in Appendix 2.

Facility Name	Permit Details		Permit No.	Latitude	Longitude
Individual Permits					
Mt Clemens WWTP			MI0023647	42.6000	-82.8661
Selfridge ANGB			MI0055328	42.6111	-82.8306
MDOT - Statewide MS4			MI0057364	na	na
New Haven Schools-Ray Twp			MI0058039	42.7203	-82.8794
Regulated Municipal Separate Storm Sewers					
Oakland Co MS4	Phase II	Watershed Permit	MIG610042	na	na
Macomb Co MS4	Phase II	Watershed Permit	MIG610052	na	na
Shelby Twp MS4-Macomb	Phase II	Watershed Permit	MIG610115	na	na
Rochester MS4-Oakland	Phase II	Watershed Permit	MIG610219	na	na
Rochester Hills MS4-Oakland	Phase II	Watershed Permit	MIG610283	na	na
Clinton Twp MS4-Macomb	Phase II	Watershed Permit	MIG610299	na	na
Center Line MS4-Macomb	Phase II	Watershed Permit	MIG610304	na	na
Washington Twp MS4-Macomb	Phase II	Watershed Permit	MIG610305	na	na
Utica MS4-Macomb	Phase II	Watershed Permit	MIG610306	na	na
Romeo MS4-Macomb	Phase II	Watershed Permit	MIG610309	na	na
Mount Clemens MS4-Macomb	Phase II	Watershed Permit	MIG610311	na	na
Macomb Twp MS4-Macomb	Phase II	Watershed Permit	MIG610312	na	na
Chesterfield Twp MS4-Macomb	Phase II	Watershed Permit	MIG610310	na	na
Fraser MS4-Macomb	Phase II	Watershed Permit	MIG610308	na	na
Harrison Twp MS4-Macomb	Phase II	Watershed Permit	MIG610313	na	na
Selfridge ANGB MS4 - Macomb	Phase II	Jurisdictional Permit	MIS040043	na	na
Sterling Heights MS4	Phase I	Jurisdictional Permit	MIS040085	na	na
Warren MS4	Phase I	Jurisdictional Permit	MIS040088	na	na
Cleanup of Water Contaminated by Petroleum Products, General Permit: MIG080000					
Speedway SuperAmerica 2254			MIG081076	42.6716	-83.0166
Non Contact Cooling Water, General Permit: MIG250000					
International Paper Co-Warren			MIG250009	42.4633	-82.9933
Storm Water from Industrial Activities, General Permit: MIS110000					
See Appendix 1					
Storm Water Discharges With Required Monitoring, General Permit: MIS120000					
DuPont-Mt Clemens			MIS120007	42.6125	-82.8897

Table 9. USGS gage locations for each station and the period of record for each gage used in load duration curve development.

Gage Number	Location	Stations	Period of Record
4165500	Clinton River at Moravian Dr.	CR1-CR2	Oct 1968 to current year
4164500	N. Br. Clinton at Mt. Clemens	CR4, NB1, NB5-NB8 and MB1-MB4	May 1947 to current year.
4164000	Clinton near Fraser	CR5	May 1947 to current year.
4164300	East Branch Coon Creek at Armada	CR6, NB2-NB4	October 1958 to current year.
4161820	Clinton at Sterling Heights	CR7-CR11	October 1978 to December 1982, March 1996 to May 1998, July 2001 to current year.
4161540	Paint Cr. At Rochester	CR12	October 1959 to current year.
4161000	Clinton at Auburn Hills	CR13	May 1935 to June 1939 and February to September 1940 , October 1956 to September 1982 , water years 1983-91 (operated as a crest-stage partial-record station), July 2001 to September 2002, water year 2003 (operated as a crest-stage partial-record station), April 2004 to current year.

Appendix 1. Assessment units proposed to be listed as nonattaining for the PBC and TBC designated uses in the 2010 Section 303(d) list and addressed in this TMDL.

CLINTON RIVER **AUID**: 040900030306-01
County: Macomb SIZE: 51.9 M
Location: Armada and Ray Drain, Coon Creek, Priest Drain, Tupper Brook, Unnamed Tributaries to Coon Creek, and Unnamed Tributary to Priest Drain
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030307-01
County: Macomb SIZE: 32.4 M
Location: Middle Branch Clinton River and Unnamed Tributaries to Middle Branch Clinton River
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Sewage discharges in unsewered areas and illicit connections to storm sewers
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030307-02
County: Macomb SIZE: 17.1 M
Location: Unnamed Tributaries to Yates Drain and Yates Drain
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030308-01
County: Macomb SIZE: 32.8 M
Location: Healy Drain, Heide Drain, Miller Drain, Price Brook, Unnamed Tributaries to Healy Drain, and Unnamed Tributary to Price Brook
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030309-01
County: Macomb SIZE: 57.7 M
Location: Bannister Drain, Crittenden Drain, Decker Drain, Dunn Drain, Harris Drain, Kenner Drain, Lewis Drain, Longstaff Drain, Longstaff Drain Number Two, Shoemaker Drain, Unnamed Tributary to Middle Branch Clinton River, and Utica Drain
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Sewage discharges in unsewered areas and illicit connections to storm sewers
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030310-01
County: Macomb SIZE: 3.8 M
Location: North Branch Clinton River
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

Appendix 1 cont.

CLINTON RIVER **AUID**: 040900030310-02
County: Macomb SIZE: 9.7 M
Location: North Branch Clinton River and Wyman Drain
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030310-04
County: Macomb SIZE: 19.6 M
Location: North Branch Clinton River
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030310-05
County: Macomb SIZE: 10 M
Location: CAMP BROOK DRAIN
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030311-01
County: Macomb SIZE: 47.9 M
Location: Heydenreich Drain, Howard Drain, Middle Branch Clinton River, Miller Drain, Nicol Drain, Pingle Drain, Preston Drain, Unnamed Tributaries to Middle Branch Clinton River, and Zander Drain
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture, sewage discharges in unsewered areas and illicit connections to storm sewers
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030312-01
County: Macomb SIZE: 47.8 M
Location: Conklin Drain, Hammon Drain, Hart Drain, McBride Drain, North Branch Clinton River, Thoel Drain, Unnamed Tributary to Hart Drain, and Unnamed Tributary to McBride Drain
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Agriculture and Sewage Discharges in Unsewered Areas
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030401-01
County: Macomb SIZE: 20.2 M
Location: SWEENEY DRAIN AND HARRINGTON DRAIN
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Sanitary Sewer Overflows and illicit connections to storm sewer
TMDL Year(s): 2010

CLINTON RIVER **AUID**: 040900030402-04
County: Macomb SIZE: 14.8 M
Location: Clinton River, Cranberry Marsh Drain, Faulman Drain, Hildebrandt Drain, Kukuk Drain, and Unnamed Tributaries to Clinton River
Use impairments: Total and partial body contact recreation.
Cause: *E. coli*
Source: Combined Sewer Overflows from Pontiac
TMDL Year(s): 2010

Appendix 2. List of facilities holding Certificates of Coverage under the Industrial Stormwater Permit (MIS11000) within the TMDL watershed.

Storm Water from Industrial Activities, General Permit: MIS110000			
Facility	Permit No.	Latitude	Longitude
Continental Plastics	MIS110061	42.5425	-82.9322
Blue Water Fabricators	MIS110067	42.6264	-82.9039
Lincoln Die Casting-Roseville	MIS110069	42.4939	-82.9661
CBS Boring & Machining-Fraser	MIS110073	42.5442	-82.9383
Joint Production Technology	MIS110074	42.6753	-82.9733
Auto-Con Corp-Clinton Twp	MIS110080	42.5559	-82.9278
Jolico-JB Tool Inc	MIS110083	42.6600	-83.0697
Westgood Mfg-15211 11 Mile	MIS110084	42.4939	-82.9644
DieTech North America LLC	MIS110085	42.5125	-82.9500
A & M Industries	MIS110087	42.5583	-82.9167
Triumph Gear Sys-Macomb Inc	MIS110091	42.6714	-82.9731
H & M Machining Inc-Roseville	MIS110094	42.5136	-82.9497
Thread-Craft-Sterling Hgts	MIS110096	42.6169	-83.0372
Howard Finishing LLC	MIS110105	42.5144	-82.9600
Barcoa Manufacturing	MIS110122	42.6019	-82.8519
Selfridge Plating-Mt Clemens	MIS110123	42.6031	-82.8519
Par-Kut International	MIS110124	42.6000	-82.8539
Northern Industrial Mfg	MIS110125	42.6014	-82.8553
Yates Cider Mill LLC	MIS110213	42.6728	-83.0933
Johnson Controls-Mt Clemens	MIS110224	42.6044	-82.8983
Mini Mix Supply-Clinton Twp	MIS110233	42.5486	-82.9275
Sur-Flo Plastics-Warren	MIS110235	42.4750	-82.9825
Arlington Transit Mix	MIS110243	42.6694	-83.0367
Profile Mfg-Chesterfield	MIS110250	42.6722	-82.8494
Ernies Auto Parts	MIS110253	42.6050	-82.8517
Barrett Paving-Mt Clemens	MIS110256	42.6008	-82.8917
Don & Hanks Highway Auto Parts	MIS110259	42.5103	-82.9567
Harry & Sons Auto Parts-Warren	MIS110260	42.4897	-82.9769
Waste Management-East	MIS110263	42.5419	-82.8847
Visteon Corp-Utica Fac	MIS110276	42.6661	-83.0531
Lunar Industries-Clinton Twp	MIS110280	42.5500	-82.9267
Hydra-Fab-Eastpointe	MIS110304	42.4644	-82.9706
Burkard Industries Inc	MIS110307	42.5558	-82.9300
M & W Manufacturing Co	MIS110308	42.4636	-82.9844
Superior Heat Treat LLC	MIS110333	42.5625	-82.9167
A-1 Stampings-Fraser	MIS110334	42.5417	-82.9292
Aero Grinding Inc-Roseville	MIS110338	42.5042	-82.9611
Great Lakes Paper Stock Corp	MIS110340	42.5208	-82.9483
Tonys Die & Machine-Warren	MIS110342	42.4695	-82.9839
TBL Trailer Inc-Fraser	MIS110354	42.5303	-82.9417
Wolverine Bronze Co-Roseville	MIS110358	42.5047	-82.9681
Middleton Auto Parts-Fraser	MIS110361	42.5406	-82.9339
Venture Ind-Masonic Plt	MIS110369	42.5314	-82.9450
Moon Roof Corp of America	MIS110371	42.5022	-82.9625
TM Smith Tool Intl Corp	MIS110374	42.6039	-82.8972
Fori Automation-Shelby Twp	MIS110381	42.6706	-82.9811
Norgren Automotive-Clinton Twp	MIS110382	42.6292	-82.8758
Warhoops Auto & Truck Parts	MIS110387	42.6000	-83.0417
Van Loon Ind-Clinton Twp	MIS110400	42.5661	-82.9144

Appendix 2 cont.

Storm Water from Industrial Activities, General Permit: MIS110000			
Facility	Permit No.	Latitude	Longitude
Radar Industries-Roseville	MIS110401	42.5022	-82.9628
Inter-Lakes Bases-Fraser	MIS110404	42.5497	-82.9428
Ultimate Hydroforming Inc	MIS110406	42.6025	-83.0361
Global Rollforming Systems LLC	MIS110411	42.5074	-82.9555
Regal Prototypes Inc	MIS110412	42.6208	-83.0458
A-V-R Mfg-Fraser	MIS110447	42.5485	-82.9325
Advance Precision Grinding	MIS110448	42.5125	-82.9547
Grippe Machining & Mfg Co	MIS110510	42.5158	-82.9631
US Mfg Corp-Fraser	MIS110766	42.5317	-82.9389
SND Steel Fabrication Inc	MIS110770	42.6667	-83.0119
John Carlo-Rex Model S 2017	MIS110788	42.6272	-82.9244
Phalanx Inc-Roseville	MIS110790	42.5139	-82.9589
Edrich Products-Fraser	MIS110809	42.5410	-82.9423
A-1 Roll Co-Mt Clemens	MIS110876	42.5958	-82.8917
G & F Prototype Plasters	MIS110877	42.5431	-82.9383
Austemper-Clinton Twp	MIS110891	42.5542	-82.9333
Automated Production-Fraser	MIS110895	42.5458	-82.9364
Avon Broach & Production Co	MIS110898	42.6656	-83.1125
Electroplating Ind-Clinton Twp	MIS110914	42.6264	-82.9042
Diversified Fabricators-Fraser	MIS110916	42.5521	-82.9377
MW Gilco LLC	MIS110923	42.5161	-82.9667
Nat Asphalt Products Inc	MIS110930	42.6697	-83.0083
Discount Auto Salvage LLC	MIS110932	42.6031	-82.8903
Motor City Stamping	MIS110933	42.6517	-82.8497
Prototype Tooling & Mfg-Fraser	MIS110935	42.5500	-82.9333
Oakland Tool & Mfg-Fraser	MIS110936	42.5517	-82.9425
MNP Corporation-Utica	MIS110950	42.6219	-83.0386
Piper Industries-Roseville	MIS110952	42.5161	-82.9597
Technical Rotary Services	MIS110956	42.4822	-82.9814
RCO Engineering Inc-Roseville	MIS110957	42.5103	-82.9631
Sterling Concrete-Washington	MIS110961	42.7333	-83.0353
Wolverine Plating-Roseville	MIS110969	42.5111	-82.9556
Specialty Steel-Fraser	MIS110977	42.5506	-82.9428
FormTech Industries	MIS111019	42.5503	-82.9364
John Carlo Inc-Johnson Plt 225	MIS111036	42.6272	-82.9244
John Carlo Inc-Plt 2721	MIS111038	42.6272	-82.9244
UPS-Roseville	MIS111054	42.5131	-82.9636
Michigan Production Machining	MIS111069	42.6714	-82.9567
Concord Tool & Mfg-Mt Clemens	MIS111083	42.6031	-82.8992
Utica-Craft Industries	MIS111114	42.6700	-83.0036
Utica Transit Mix & Supply Co	MIS111147	42.6064	-83.0314
Press-Way-Clinton Twp	MIS111154	42.5542	-82.9261
CBS Boring & Machine Co Plt 3	MIS111155	42.5514	-82.9364
CBS Boring & Machine Co Plt 2	MIS111156	42.5522	-82.9428
Roberts & Sons-Roseville	MIS111158	42.5211	-82.9528
Hydra-Lock-Mt Clemens	MIS111163	42.5958	-82.8792
Midwest Brake	MIS111174	42.4883	-82.9736

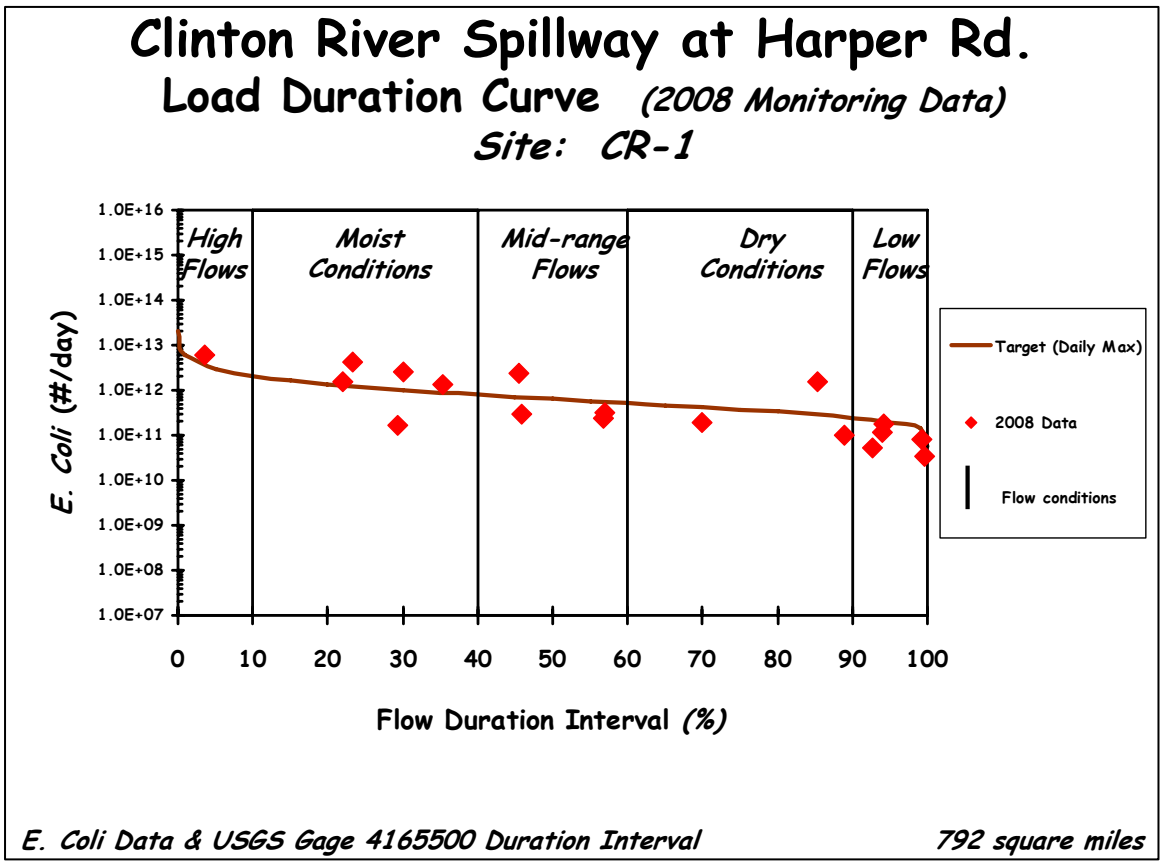
Appendix 2 cont.

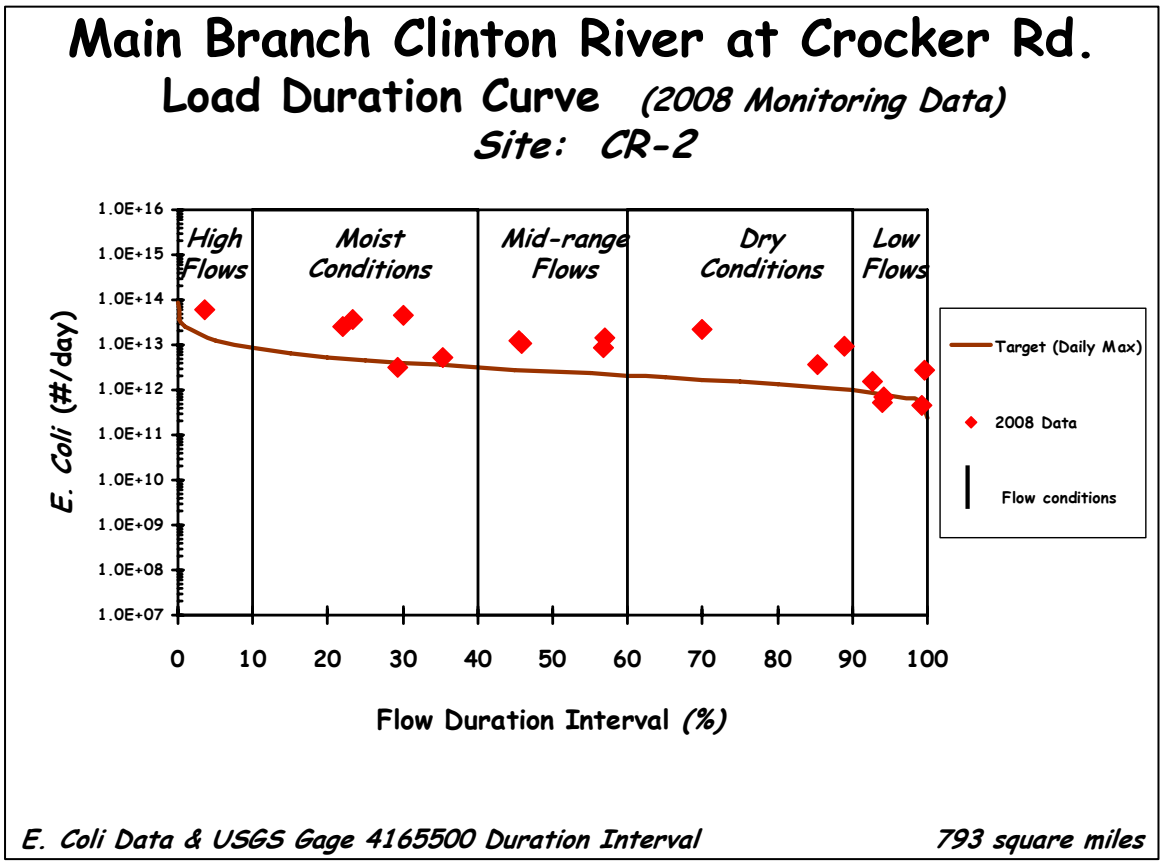
Storm Water from Industrial Activities, General Permit: MIS110000			
Facility	Permit No.	Latitude	Longitude
John Carlo Inc-2828 Rex	MIS111179	42.6272	-82.9244
John Carlo-Johnson Plt 2841	MIS111195	42.6265	-82.9211
Fairlane Tool Co-Groesbeck Hwy	MIS111207	42.5303	-82.9417
National Precast Structural	MIS111223	42.6708	-82.9811
Fairlane Products-Fraser	MIS111227	42.5450	-82.9358
Vac-Met Inc-Fraser	MIS111235	42.5281	-82.9347
JAC Products Inc Rollform	MIS111237	42.6728	-83.0103
Casadei Structural Steel Inc	MIS111245	42.6158	-83.0425
Sur-Flo Plastics-Fraser	MIS111247	42.5503	-82.9342
Radar Industries Inc-Warren	MIS111251	42.5032	-82.9705
Warren Industries Inc-Clinton	MIS111264	42.5532	-82.8876
AZ Automotive-Centerline	MIS111270	42.4683	-83.0338
AZ Automotive-Roseville	MIS111271	42.5158	-82.9675
Tower Automotive-Clinton Twp	MIS111276	42.6275	-82.8762
Lakeside Building Products	MIS111279	42.5975	-82.8865
US Farathane-Utica	MIS111281	42.6681	-83.0116
Hamlin Tool & Machine Co	MIS111283	42.6619	-83.1054
Lapeer Metal Stamping Co Inc	MIS111284	42.6044	-82.8986
Oakley Plt 4	MIS111290	42.5483	-82.9426
Oakley Plt 6	MIS111291	42.5522	-82.9327
R J Plt 3-Fraser	MIS111293	42.5520	-82.9428
Oakley Plt 2	MIS111294	42.5570	-82.8778
Oakley Plt 3	MIS111295	42.5570	-82.8778
Oakley Plt 1-Clinton Township	MIS111296	42.5570	-82.8778
Oakley Plt 7	MIS111299	42.5522	-82.9327
Plast-O-Foam	MIS111300	42.6236	-82.8594
Advanced Accessory Systems	MIS111310	42.6690	-82.9873
Atlas Tool Inc-Roseville	MIS111321	42.5185	-82.9512
Logghe Stamping Co-Fraser	MIS111361	42.6328	-82.9760
First Student Inc 20197	MIS111370	42.5997	-82.8881
Special Tool & Engineering Inc	MIS111377	42.5481	-82.9331
Rivas Inc	MIS111379	42.6693	-82.9824
Century Plastics Inc	MIS111389	42.6694	-82.9736
Century Plastics Inc	MIS111389	42.6694	-82.9736
La Fata Cabinets	MIS111402	42.6696	-82.9774
Diversified Industries	MIS111403	42.5125	-82.7583
Powder Cote II	MIS111406	42.6031	-82.8956
Positive Ind-American Laser	MIS111414	42.4638	-82.9290
Positive Ind-American Laser	MIS111414	42.4638	-82.9290
Positive Ind-American Laser	MIS111414	42.4638	-82.9290
Duggan Manufacturing	MIS111416	42.6595	-83.0707
Pamar Ent Portable Crusher	MIS111437	42.5958	-82.9042
Faurecia Automotive Seating	MIS111443	42.7112	-83.0524
Anderson Cook Inc	MIS111452	42.5520	-82.9428
Mica-Tec	MIS111456	42.4528	-83.0053
Acument Global Technologies	MIS111457	42.4508	-83.0077
Sterling Die and Engineering	MIS111462	42.6768	-82.9692

Appendix 2 cont.

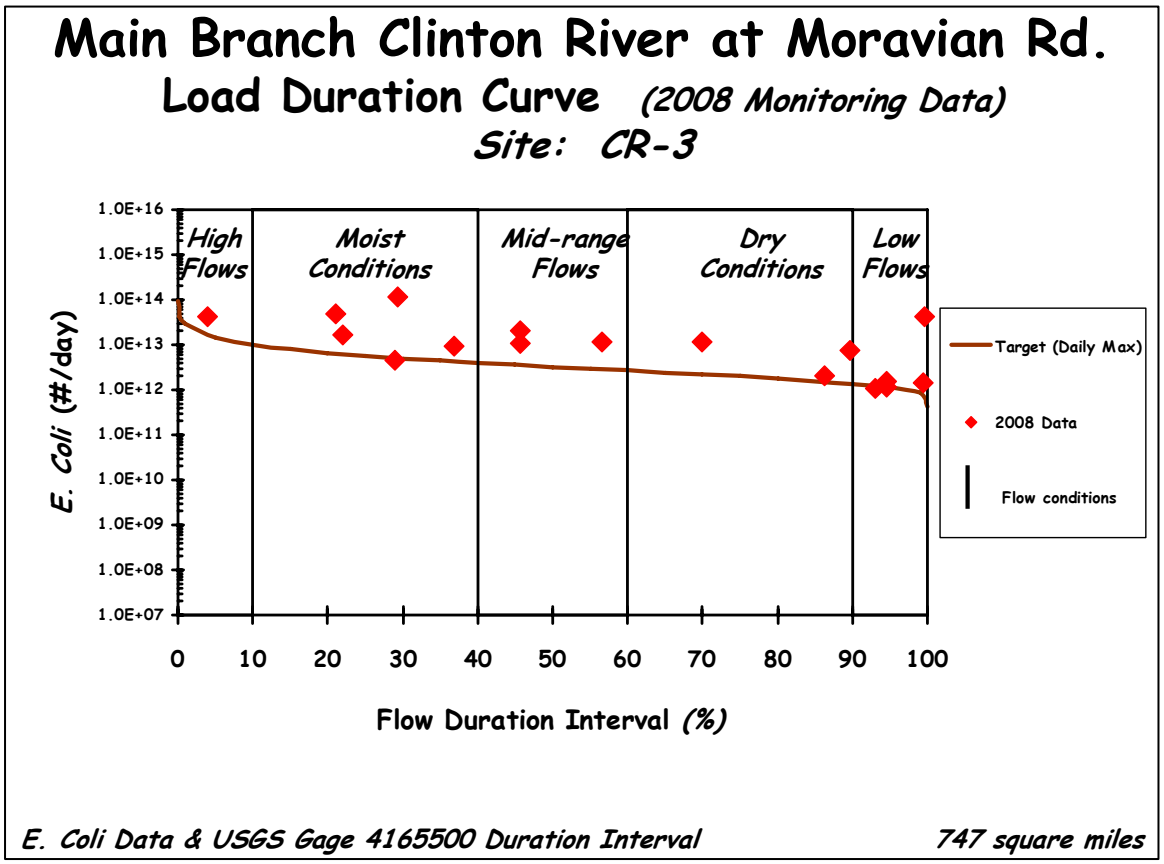
Storm Water from Industrial Activities, General Permit: MIS110000			
Facility	Permit No.	Latitude	Longitude
M & W Manufacturing Company	MIS111481	42.5186	-82.9506
Deluxe Technologies LLC-Fraser	MIS111487	42.5521	-82.9377
Accurate Boring Co	MIS111489	42.5483	-82.9426
Faurecia - Fraser	MIS111490	42.5411	-82.9373
Roush Industries-Levan Road	MIS111499	42.3729	-83.4043
Avon Gear Co	MIS111500	42.6828	-83.0025
Marten Models and Molds	MIS111502	42.5485	-82.9325
Fraser Grinding Co - Riviera	MIS111503	42.5484	-82.9376
Fraser Grinding Co - Groesbeck	MIS111504	42.5412	-82.9322
Fraser Grinding Co - James J P	MIS111505	42.5485	-82.9325
Visioneering	MIS111506	42.5332	-82.9419
US Machine Co Inc	MIS111508	42.5371	-82.9421
PCS Co	MIS111510	42.5521	-82.9377
Eifel Mold and Engineering	MIS111512	42.5258	-82.9515
Firestone Metal Products	MIS111513	42.5354	-82.9862
Supreme Gear Co	MIS111516	42.5483	-82.9426
Midwest Gear & Tool-Roseville	MIS111518	42.5158	-82.9625
Dominion Tech & Viking	MIS111519	42.5146	-82.9607
Husky LLC	MIS111520	42.5034	-82.9654
Hercules Machine Tool & Die	MIS111522	42.4767	-82.9842
Hercules Machine Tool & Die	MIS111522	42.4767	-82.9842
L & M Machining & Mfg	MIS111528	42.4767	-82.9842
Magna-Ryan Road Facility	MIS111530	42.5354	-82.9862
Troy Design & Manufacturing	MIS111532	42.4688	-83.0085
Mariah Industries Inc	MIS111534	42.4497	-82.9844
Emtech	MIS111536	42.6071	-83.0485
US Farathane-Merrill Rd	MIS111538	42.5999	-83.0481
Mid-Michigan Recycling-Macomb	MIS111543	42.6504	-82.8594
Hi-Craft Engineering	MIS111548	42.5412	-82.9322
American Metal Processing	MIS111549	42.4582	-83.0030
Iroquois Ind - Groesbeck Hwy	MIS111553	42.4842	-82.9796
Trynex Inc	MIS111554	42.4692	-82.9937
Detroit Edge Tool Co	MIS111557	42.5035	-82.9602
Florence Cement Co	MIS111570	42.6700	83.0029
Florence Cement Co Plt 701	MIS111572	42.6241	-82.9903
LTC Roll & Eng-Clinton Twp	MIS111574	42.6181	-82.8672
Iroquois Ind-Hoover	MIS111576	42.4846	-82.9747
Arin Inc	MIS111580	42.5108	-82.9657
Carroll Products	MIS111586	42.6181	-83.0442

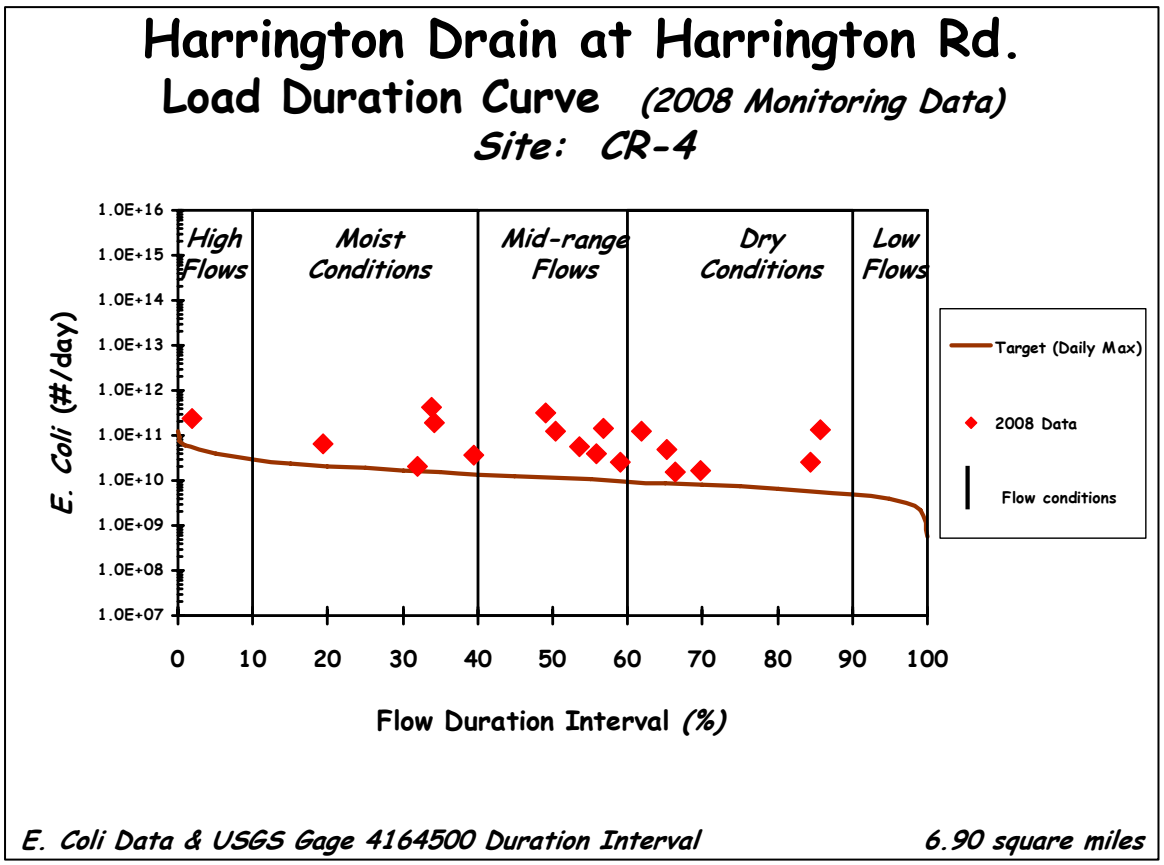
Appendix 3. Load duration curves for the Main Branch Clinton River Stations CR1-CR13. The gage used for the correlation and the drainage area size for each drainage area ratio calculation is indicated on the bottom of each chart.



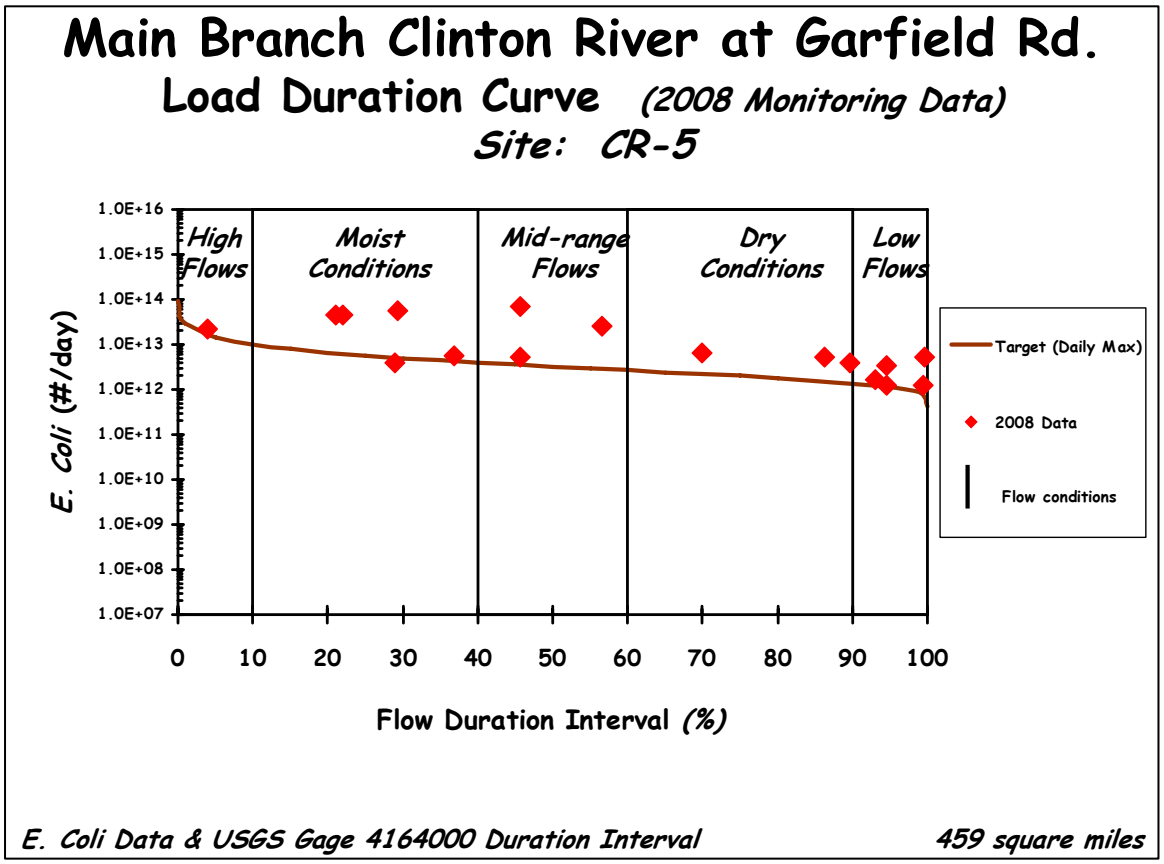


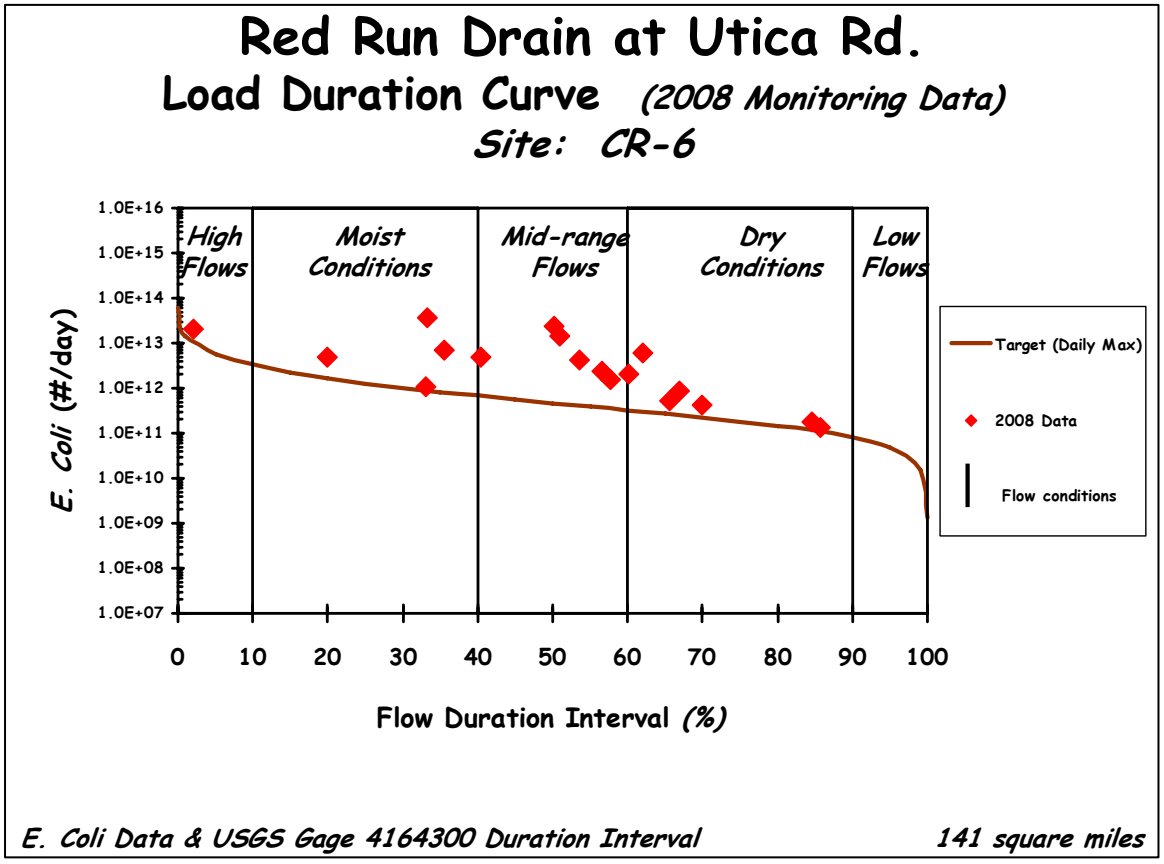
Appendix 3 cont.



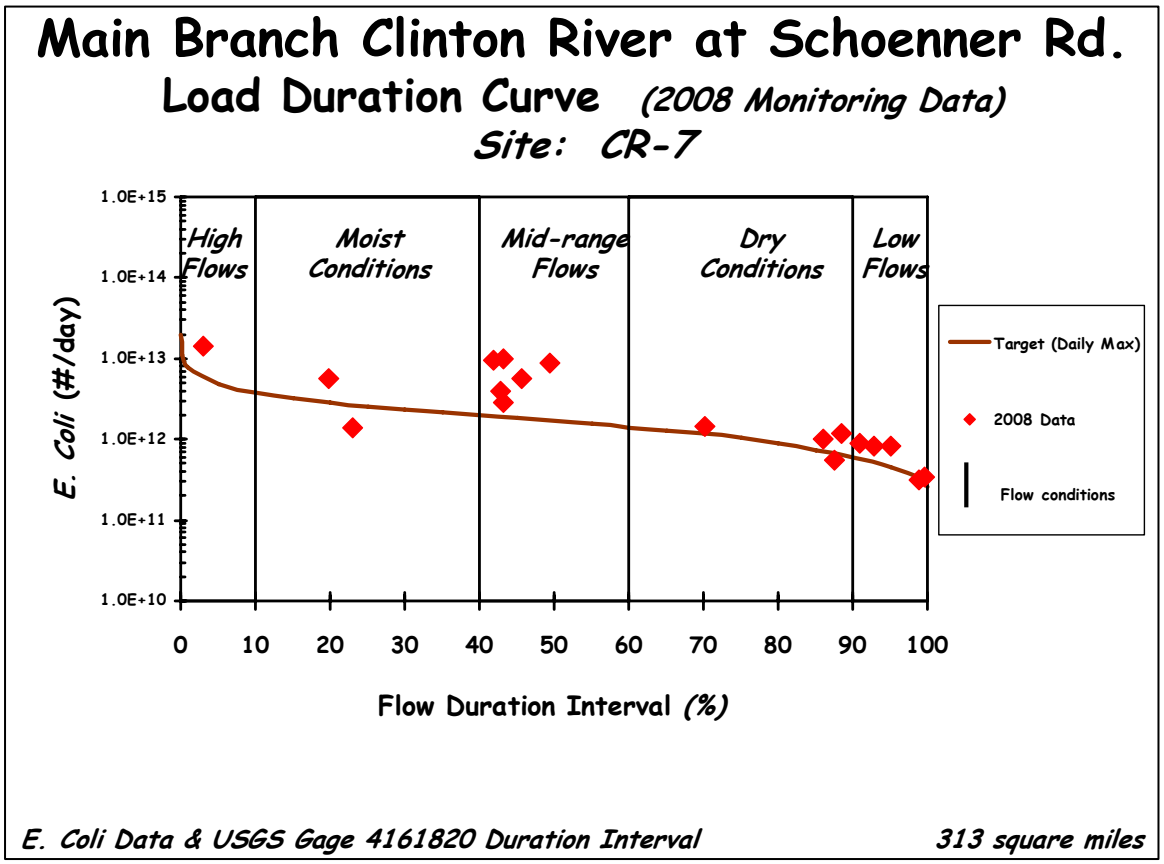


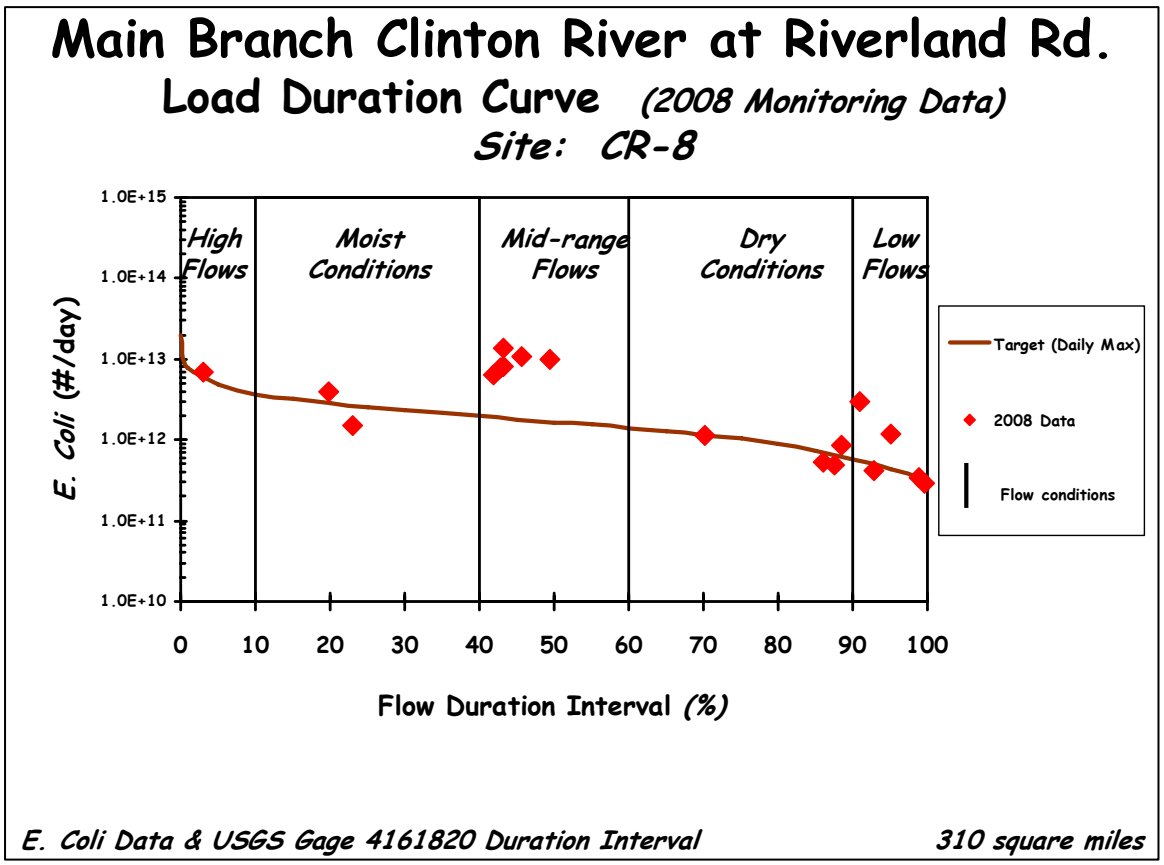
Appendix 3 cont.



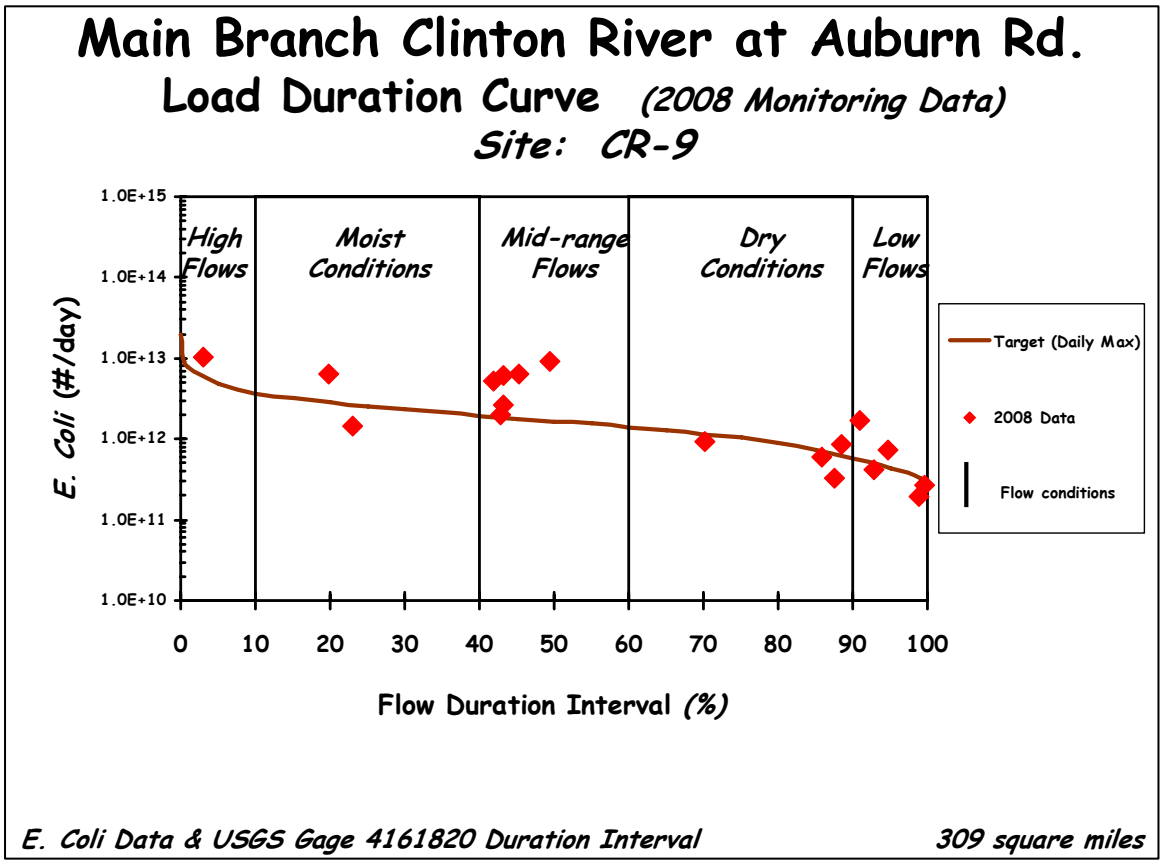


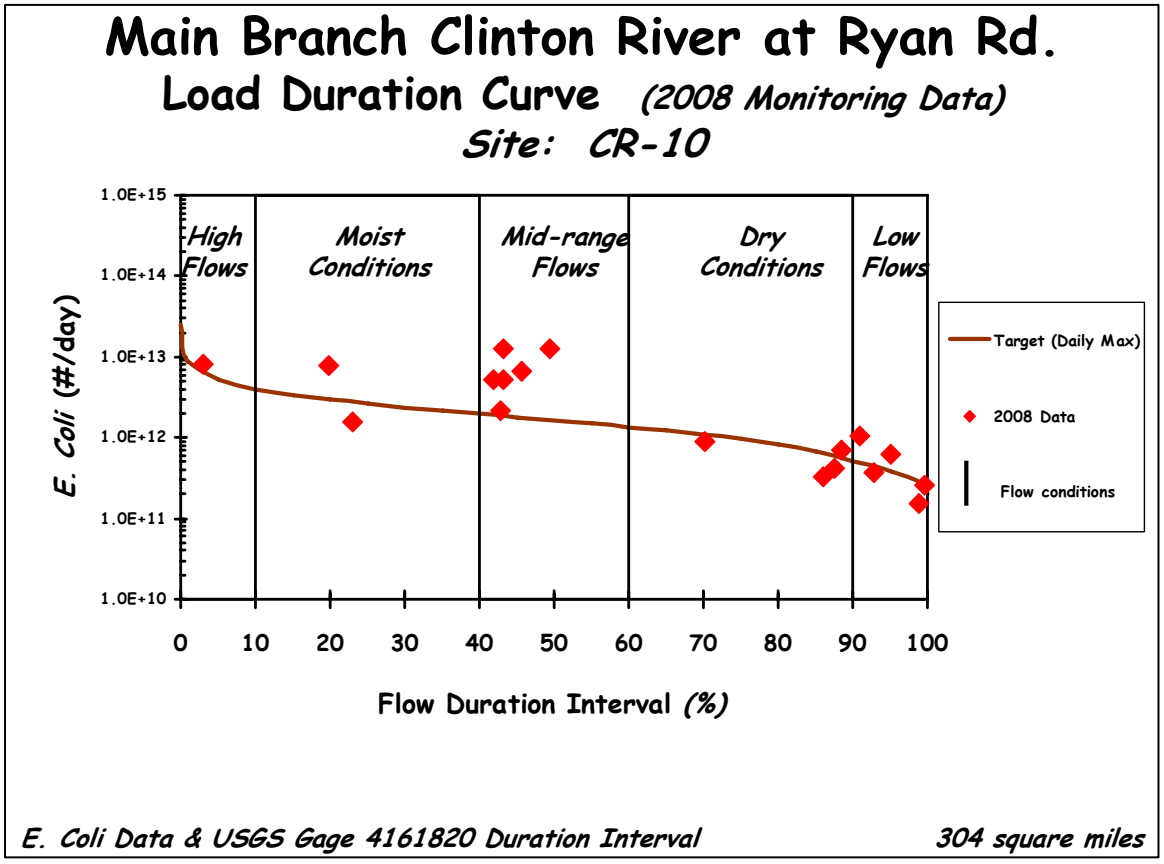
Appendix 3 cont.





Appendix 3 cont.





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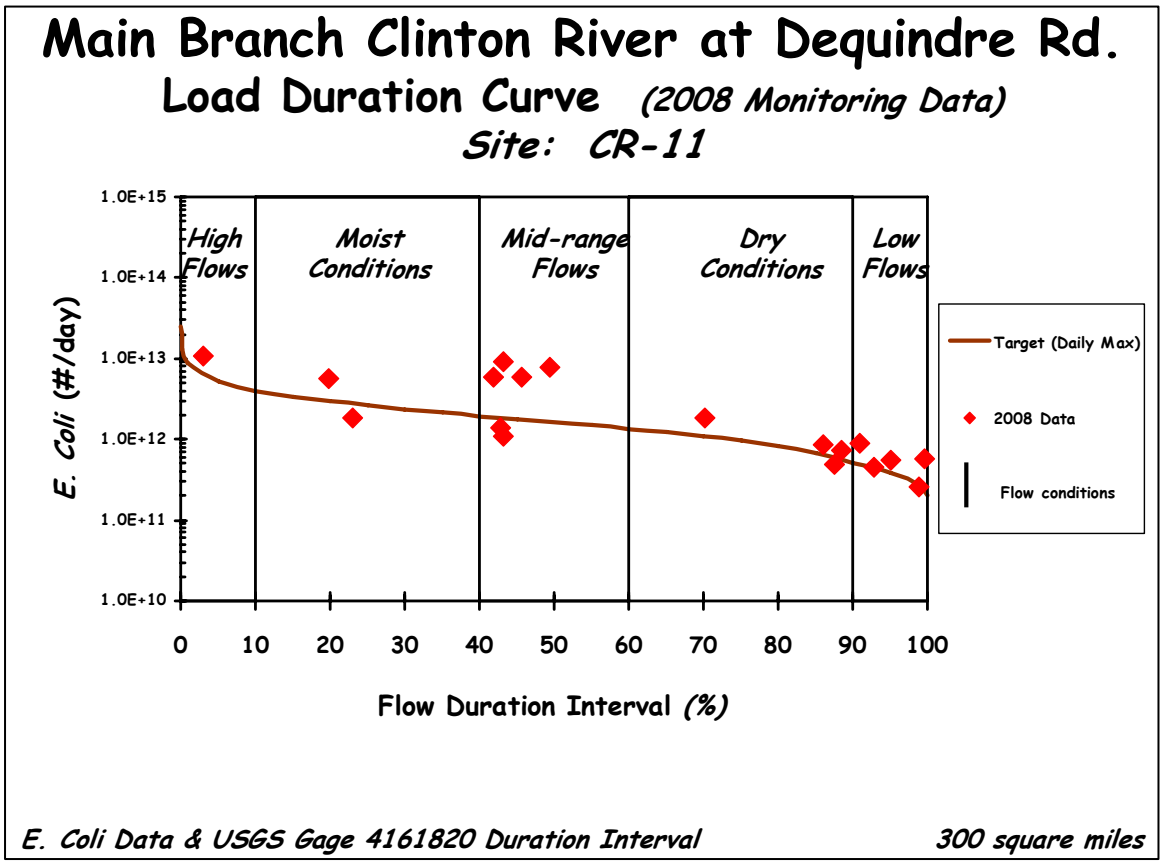
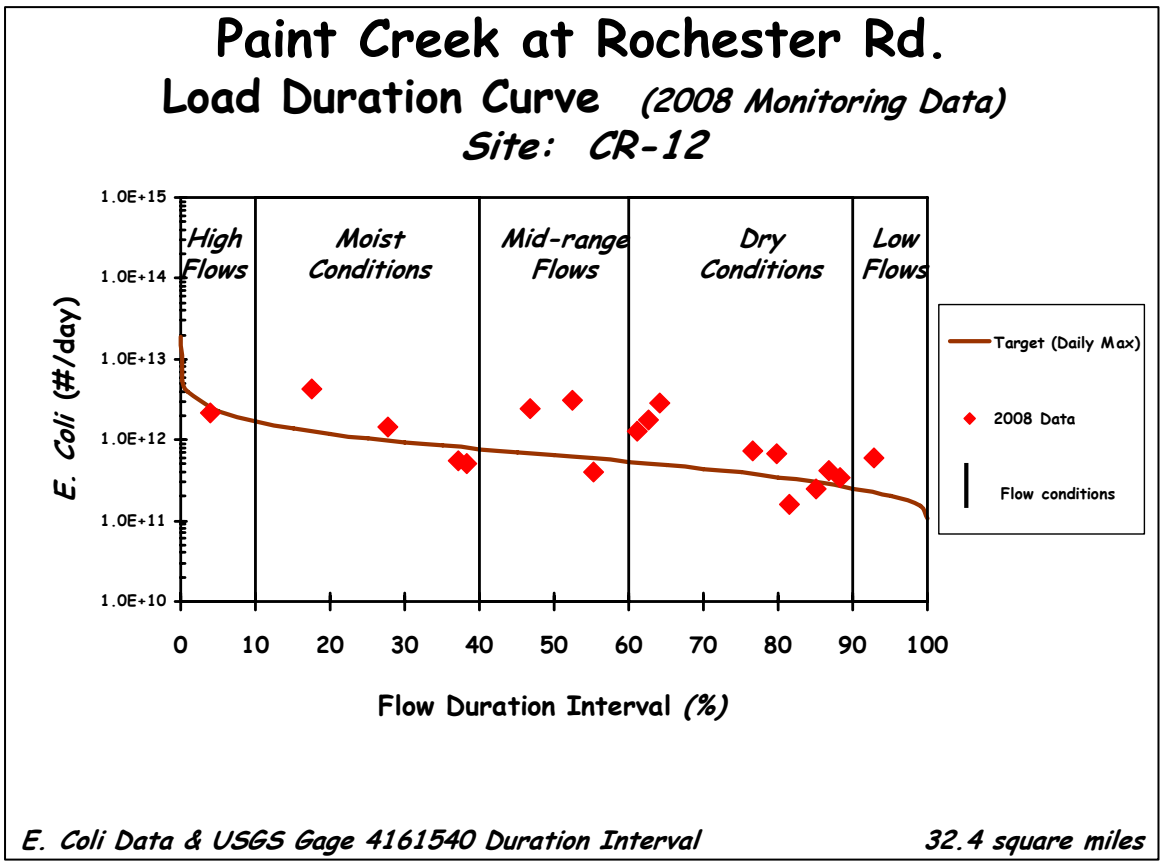
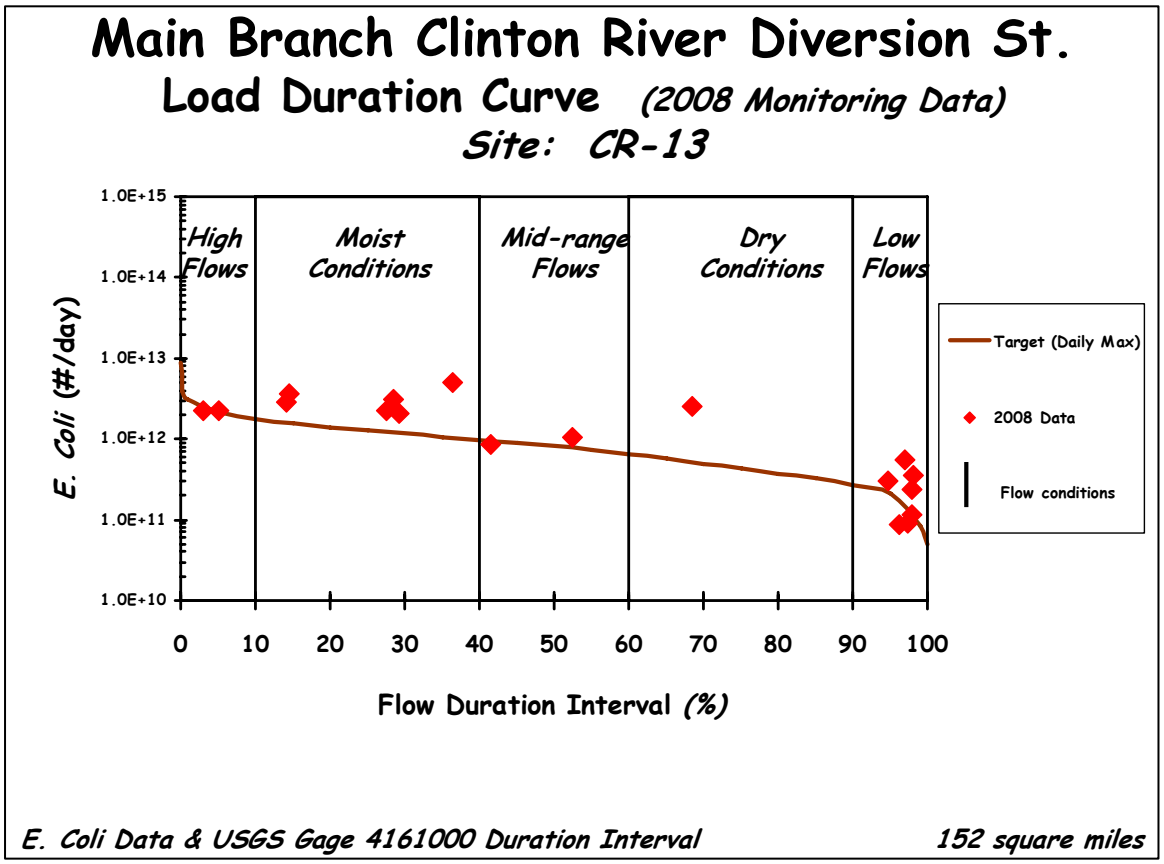
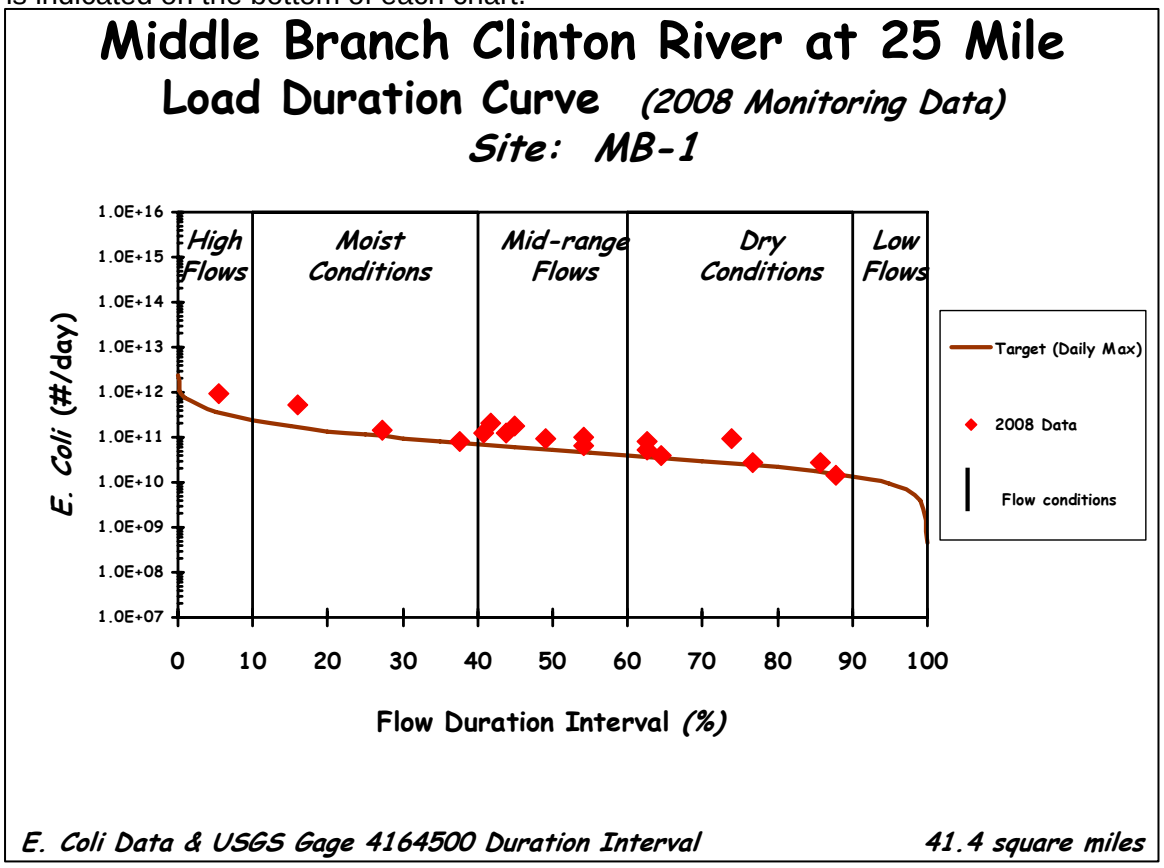


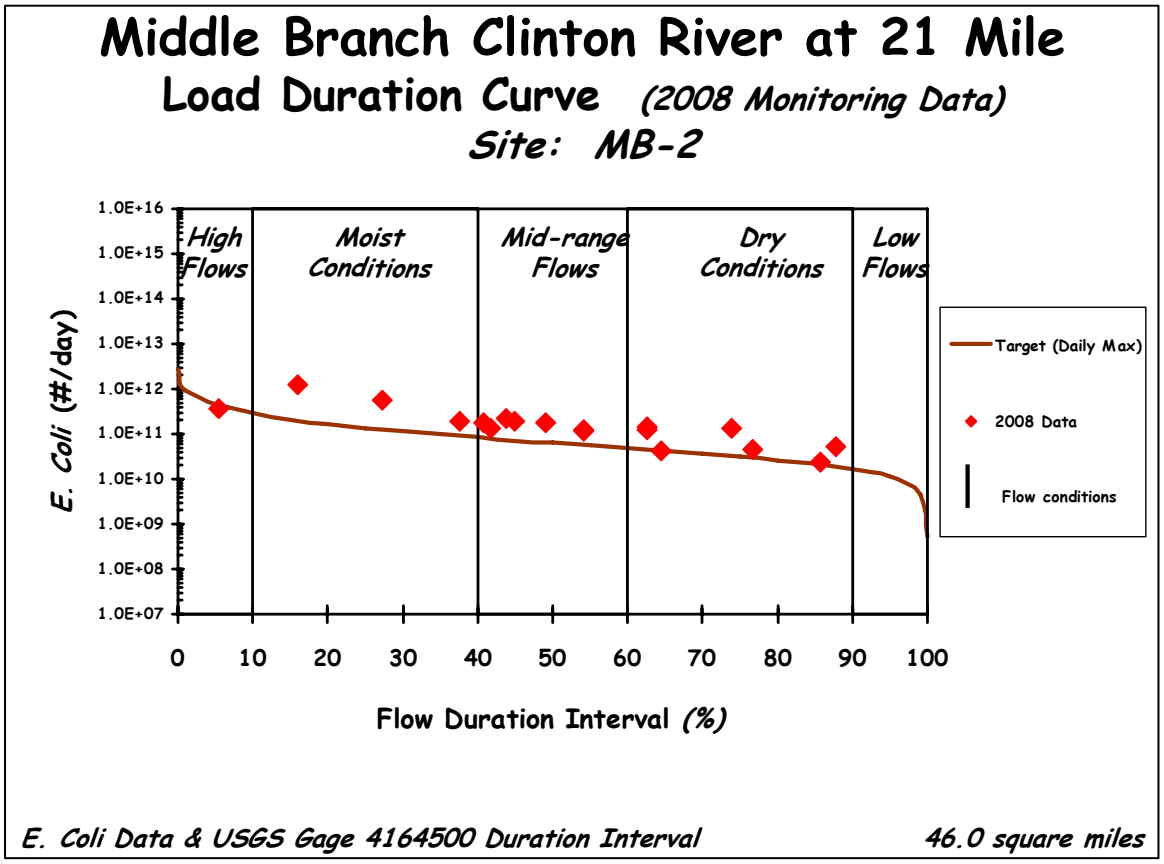


Appendix 3 cont.

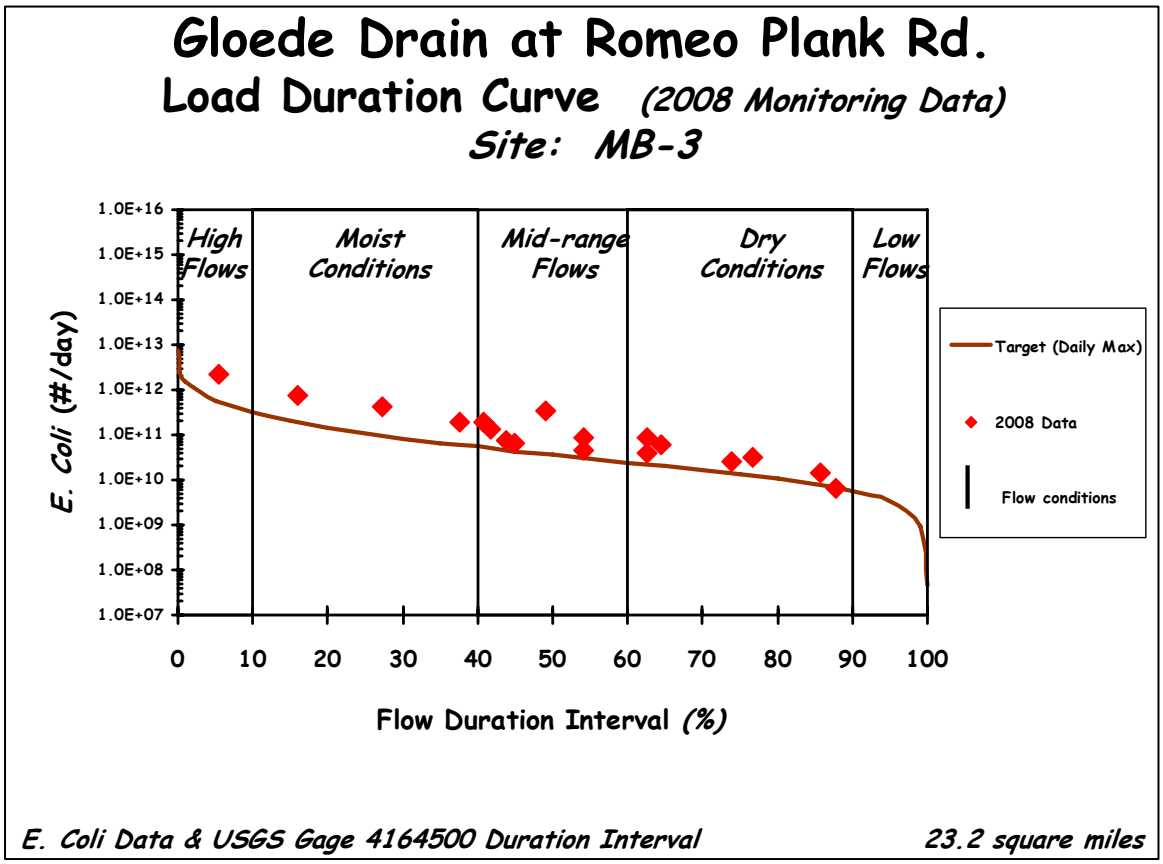


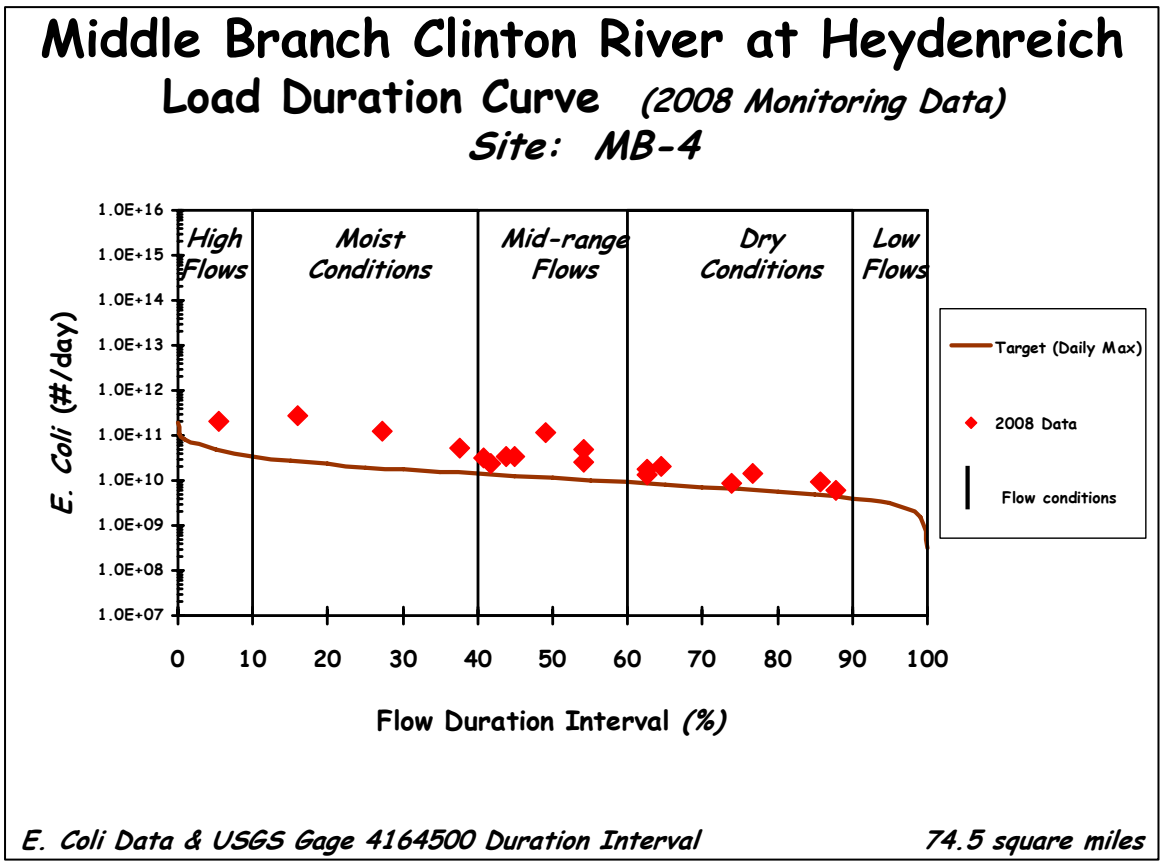
Appendix 4. Load duration curves for the Middle Branch Clinton River Stations MB1-MB4. The gage used for the correlation and the drainage area size for each drainage area ratio calculation is indicated on the bottom of each chart.



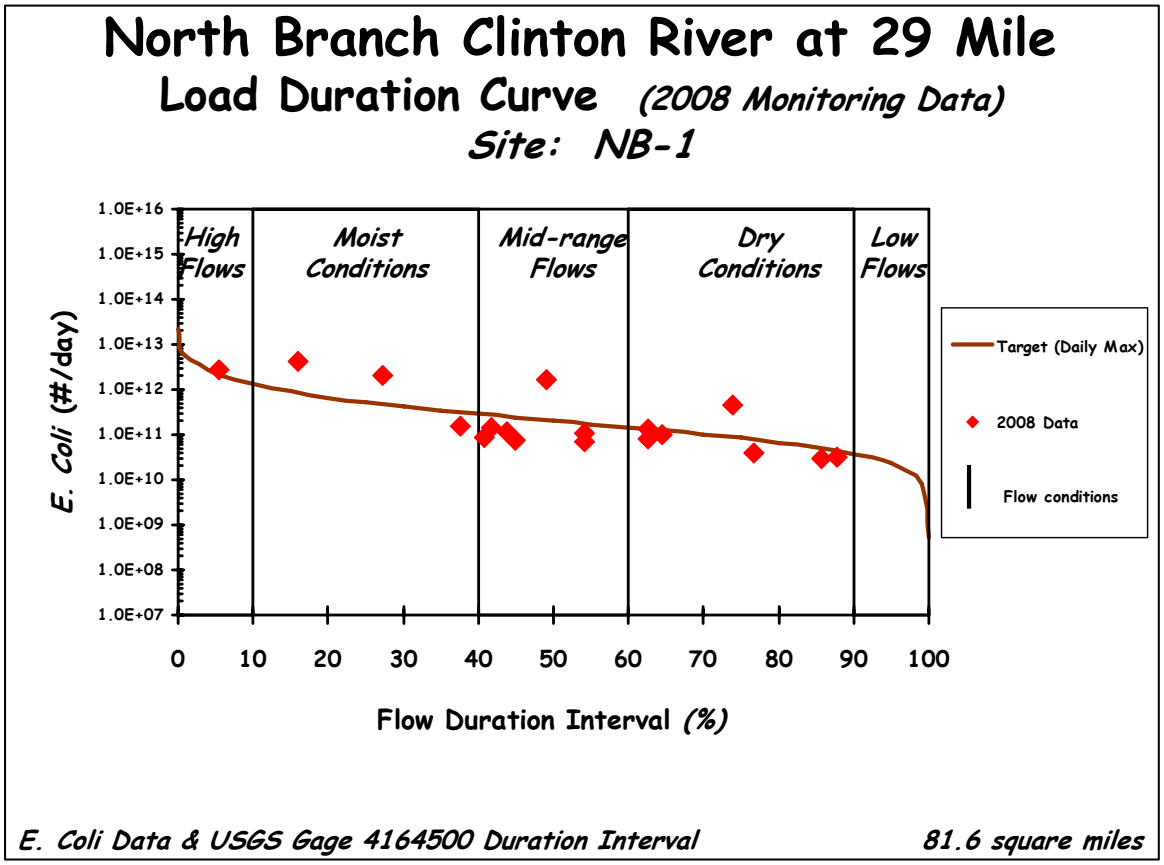


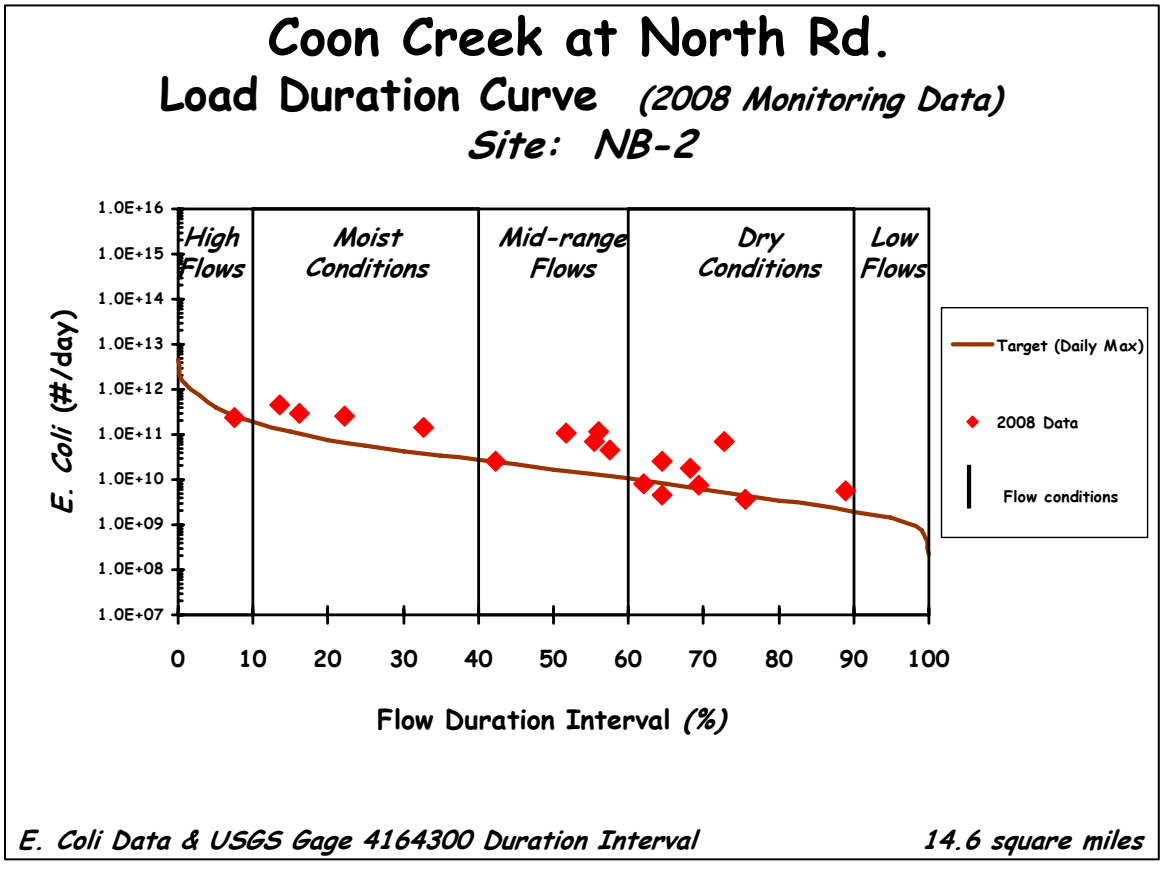
Appendix 4 cont.



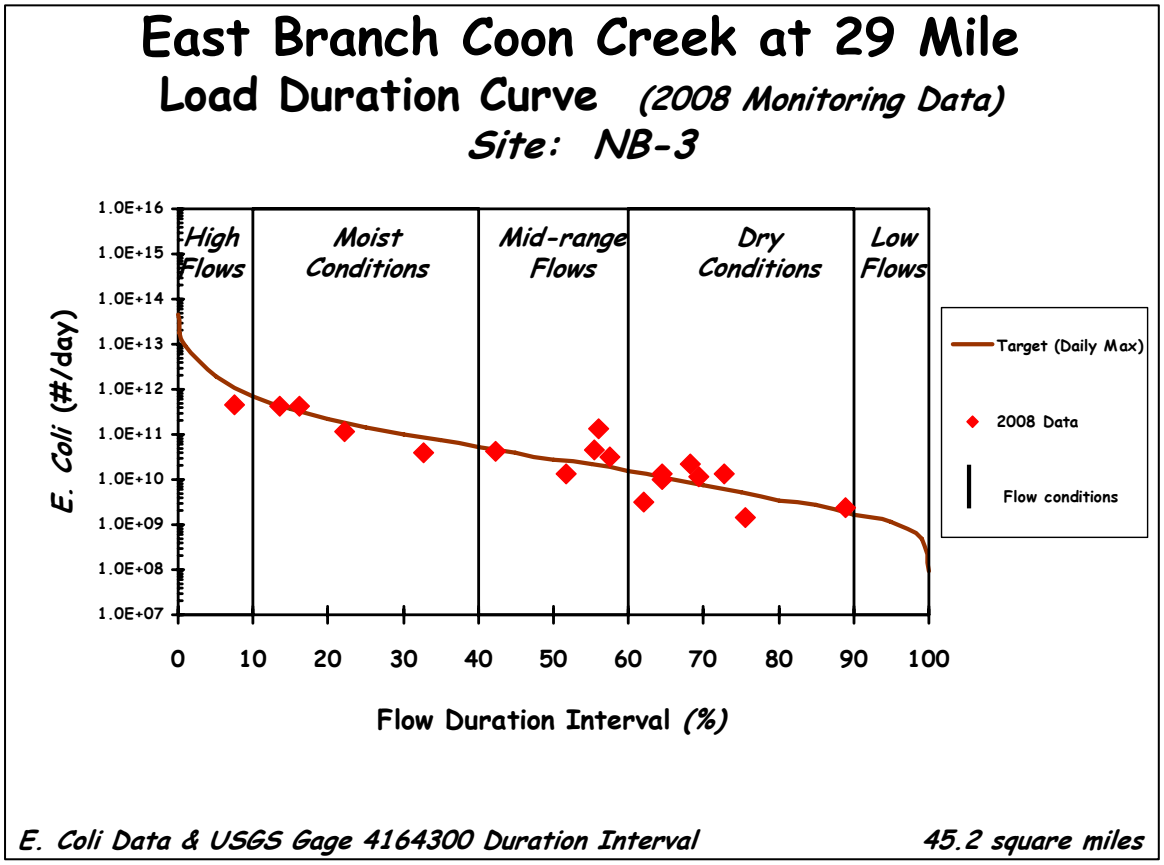


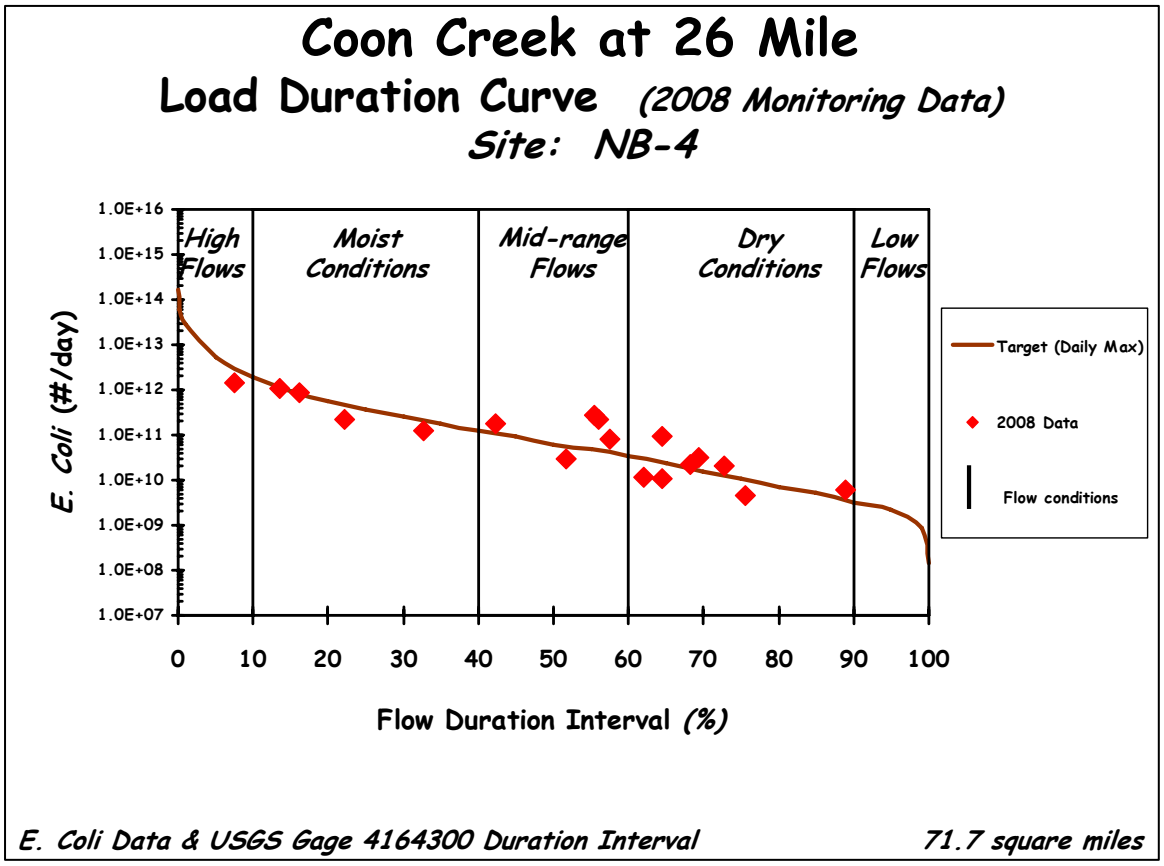
Appendix 5. Load duration curves for the North Branch Clinton River Stations NB1-NB8. The gage used for the correlation and the drainage area size for each drainage area ratio calculation is indicated on the bottom of each chart.



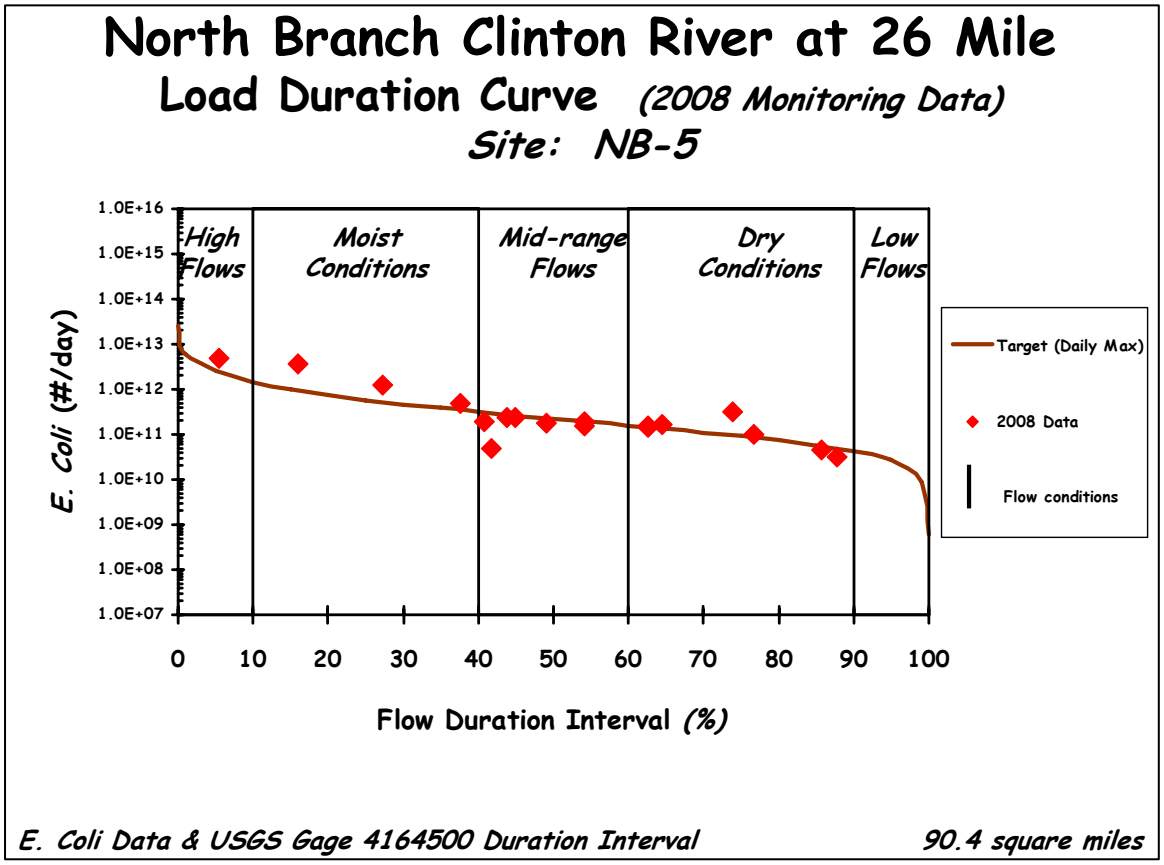


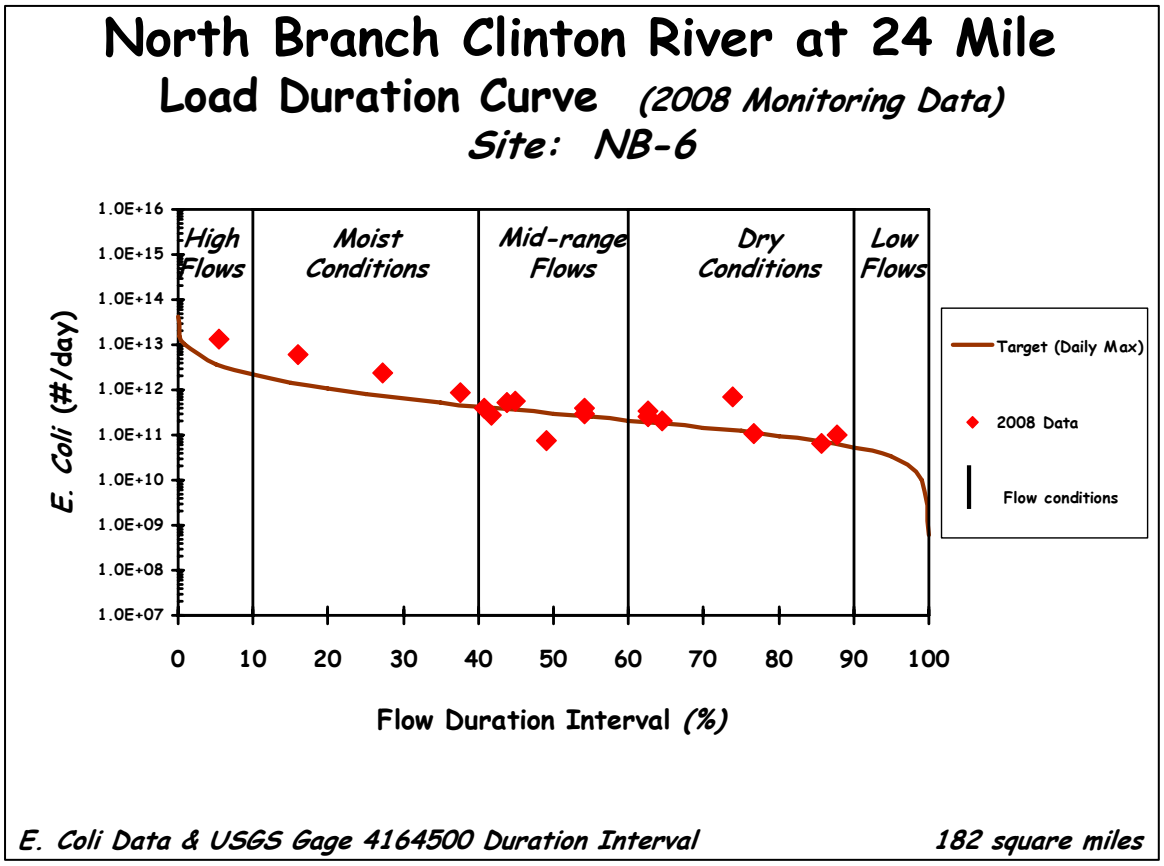
Appendix 5 cont.

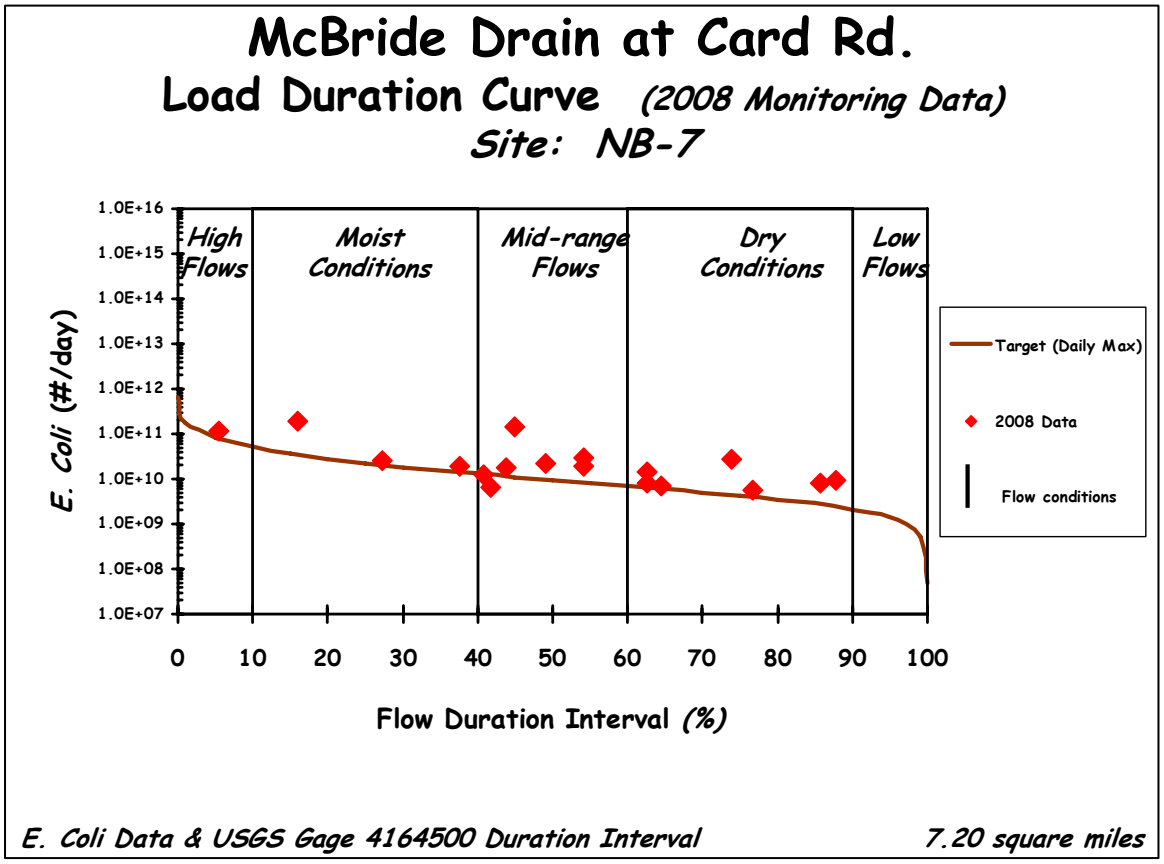


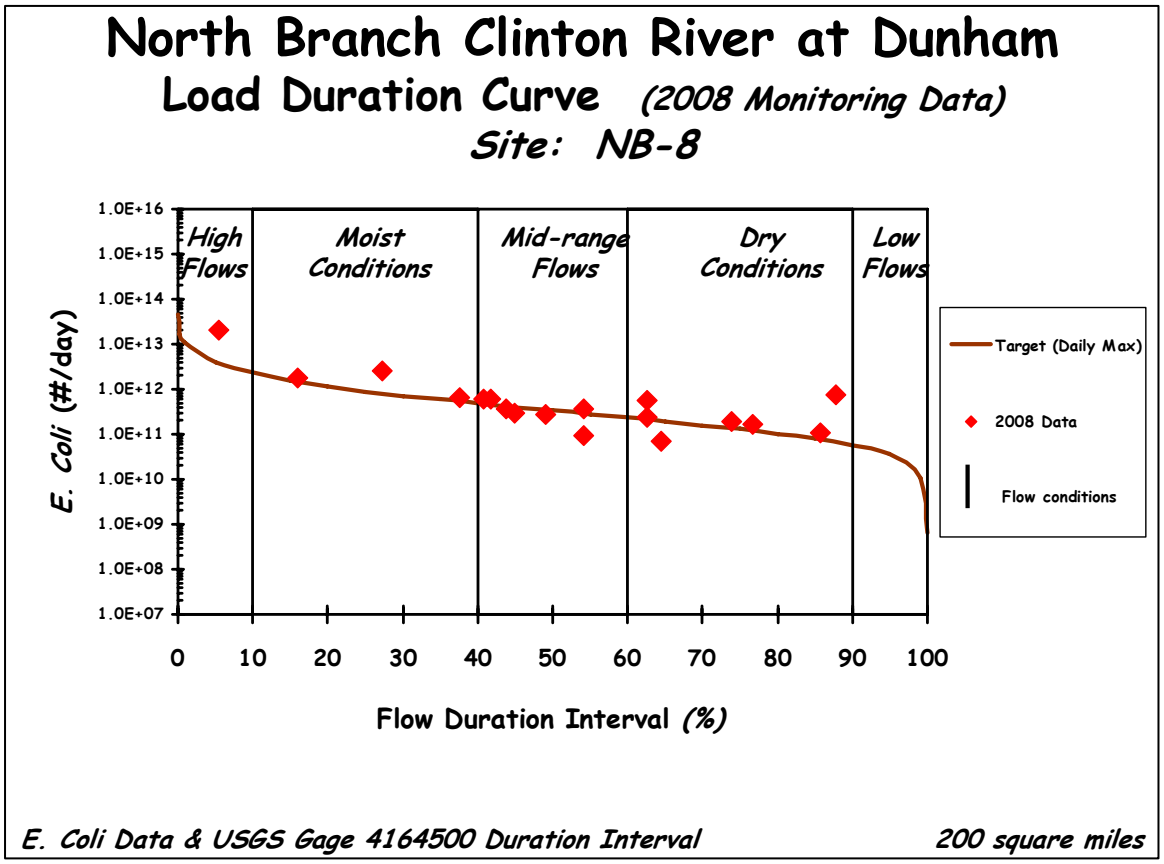


Appendix 5 cont.






McBride Drain at Card Rd.
Load Duration Curve (2008 Monitoring Data)
Site: NB-7
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
E. Coli (#/day)
1.0E+16
1.0E+15
1.0E+14
1.0E+13
1.0E+12
1.0E+11
1.0E+10
1.0E+09
1.0E+08
1.0E+07
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
Target (Daily Max)
2008 Data
Flow conditions
E. Coli Data & USGS Gage 4164500 Duration Interval
7.20 square miles


North Branch Clinton River at Dunham
Load Duration Curve (2008 Monitoring Data)
Site: NB-8
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
E. Coli (#/day)
1.0E+16
1.0E+15
1.0E+14
1.0E+13
1.0E+12
1.0E+11
1.0E+10
1.0E+09
1.0E+08
1.0E+07
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
Target (Daily Max)
2008 Data
Flow conditions
E. Coli Data & USGS Gage 4164500 Duration Interval
200 square miles

Challenges to the Health of the Huron Chain of Lakes Watershed

The Steering Committee spent one year gathering the information necessary to understand the impairments, or pollutants, to the Watershed, and their sources and causes. While the Huron Chain of Lakes Watershed contains several areas of high quality natural habitat, aquatic ecosystems, and recreational opportunities, analysis of existing data indicate that the Huron Chain of Lakes Watershed also has stretches of medium- and low-quality waterways that require mitigation of existing impairments.

Although the partners who authored the Huron Chain of Lakes Watershed Management Plan intend to address all of these challenges in the long term with targeted programs, it is important to prioritize and identify the most pressing concerns in the watershed so that resources can be spent cost-effectively in a phased approach. The impairments have been prioritized based upon analysis of existing data, the results of the road stream crossing inventory, and contributions from Steering Committee members and citizens. This information was used to prioritize the impairments from greatest threat to least threat. The sources and causes are not prioritized but known causes (k) are listed above suspected causes (s). As additional information is obtained that indicates a lower ranked impairment, source or cause should be elevated in priority, the ranking should be adjusted to reflect the new information. The following table identifies the challenges to the health of the watershed, and their sources and causes.

It is important to prioritize and identify the most pressing concerns in the Watershed so that resources can be spent cost-effectively.

Prioritized Impairments, Sources and Causes in the Huron Chain of Lakes Watershed

Impairment: High Nutrient Loading (k)	
Sources	**Causes**
Excessive runoff from developed areas (k)	Lack of BMPs at existing development areas (k) Impervious surfaces (k) Poor storm drain maintenance (s)
Failing septic tanks (k)	Old units are too small or don't meet codes (k) Lack of a required maintenance program (k) Poor maintenance/lack of education (s)
Fertilizers from residential, commercial, and golf courses (k)	Lack of buffers (k) No ordinance in place (k) Overuse/improper application of fertilizers (s)
Illicit discharges (k)	Aging sanitary sewer infrastructure (s) Inadequate inspection/detection and repair due to cost (s) Illegal septic application and trailer waste disposal (s)
NPDES permitted facilities (k)	Nutrients in effluent (k)
Agricultural runoff from fertilizers/ livestock waste (s)	Lack of BMPs (upland and riparian buffers) (s) Exposed soils (s)
Pet and wildlife waste (s)	Improper disposal of pet waste (s) Ponds increase habitat for waterfowl, wildlife (s)

Appendix I — Oakland County NPDES Permit

PERMIT NO. MI0060089

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act (33 U.S.C. 1251 *et seq*., as amended; the "Federal Act"); Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); Part 41, Sewerage Systems, of the NREPA; and Michigan Executive Order 2019-06,

Oakland County
Water Resources Commissioner's Office
One Public Works Drive, Building 95 West
Waterford, MI 48328

is authorized to discharge from the Municipal Separate Storm Sewer System (MS4)

designated as **Oakland CDC MS4**

to surface waters of the state of Michigan in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

This permit takes effect on January 1, 2021. This permit is based on a complete application submitted on March 24, 2008, as amended through July 16, 2020.

The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date this permit shall supersede Certificate of Coverage No. MIG610042, issued on December 16, 2003, which is hereby revoked upon the effective date of this permit.

This permit and the authorization to discharge shall expire at midnight, **October 1, 2023**. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department of Environment, Great Lakes, and Energy (Department) by **April 4, 2023**.

Issued: November 12, 2020.

Original signed by Christine Alexander
Christine Alexander, Manager
Permits Section
Water Resources Division

PERMIT FEE REQUIREMENTS

In accordance with Section 324.3118 of the NREPA, the permittee shall make payment of an annual storm water fee to the Department for each January 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. Payment may be made electronically via the Department's MiWaters system. The MiWaters website is located at https://miwaters.deq.state.mi.us. Payment shall be submitted or postmarked by March 15 for notices mailed by February 1. Payment shall be submitted or postmarked no later than 45 days after receiving the notice for notices mailed after February 1.

Annual Permit Fee Classification: Municipal Storm Water – County

CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Warren District Office of the Water Resources Division. The Warren District Office is located at 27700 Donald Court, Warren, MI 48092-2793, Telephone: 586-753-3700, Fax: 586-751-4690.

CONTESTED CASE INFORMATION

Any person who is aggrieved by this permit may file a sworn petition with the Michigan Administrative Hearing System within the Michigan Department of Licensing and Regulatory Affairs, c/o the Michigan Department of Environment, Great Lakes, and Energy, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Department of Licensing and Regulatory Affairs may reject any petition filed more than 60 days after issuance as being untimely.

PART I

Section A. Limitations and Monitoring Requirements

1. Authorized Discharges

a. Authorized Outfalls and Points of Discharge
This permit authorizes the discharge of storm water from the permittee's MS4 to the surface waters of the state via the outfalls and points of discharge identified in the permittee's application and as modified in accordance with this permit. Such discharges shall be controlled and monitored by the permittee in accordance with this permit.

b. Nested MS4 Discharges
This permit authorizes the discharge of storm water to surface waters of the state from a nested MS4 owned or operated by public bodies that include, but are not limited to, public school districts; public universities; airports; or county, state, or federal agencies. The permittee may request to modify permit coverage to add or remove a nested MS4 by submitting a request to the Department for approval. Modifications to the permit coverage may result in a permit modification, after opportunity for public comment.

c. Discharges Authorized Under Other National Pollutant Discharge Elimination System (NPDES) Permits
This permit does not prohibit the use of an MS4 for other discharges authorized under other NPDES permits, or equivalent Department approval under the NREPA or the Federal Act.

d. Water Quality Requirements
Discharges from the permittee's MS4 shall not cause or contribute to an exceedance of water quality standards in the receiving waters. This includes, but is not limited to, the requirement set forth in R 323.1050 of the Water Quality Standards stating that the receiving waters shall not have any of the following unnatural physical properties as a result of the discharge, in quantities which are or may become injurious to any designated use: turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits.

2. Outfall or Point of Discharge Identified, Constructed, or Installed After Permit Issuance

a. Outfall or Point of Discharge Within the Permittee's Regulated Area
Authorization from the Department is required to discharge storm water to a surface water of the state from a permittee owned or operated outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit and located within the permittee's regulated area as identified in the application. For each outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit, the permittee shall request authorization to discharge storm water by providing the following to the Department in a written request:

1) whether the discharge is from an outfall or point of discharge;

2) the outfall or point of discharge identification number assigned by the permittee;

3) the surface water of the state receiving the discharge from the outfall or point of discharge;

4) a certification statement that the outfall or point of discharge is within the permittee's regulated area as identified in the application;

5) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) includes best management practices (BMPs) to comply with the minimum requirements of the permit for the outfall or point of discharge; and

PART I

Section A. Limitations and Monitoring Requirements

6) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) is being implemented in the regulated area served by the outfall or point of discharge, including having available an up-to-date storm sewer system map required in Part I.A.3.d.1) of this permit.

b. Outfall or Point of Discharge Outside the Permittee's Regulated Area
Authorization from the Department is required to discharge storm water to a surface water of the state from a permittee owned or operated outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit and located outside the permittee's regulated area as identified in the application (e.g., area served by an expanded MS4 or area previously served by a combined sewer system that is now separated). For each outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit, the permittee shall request authorization to discharge storm water by providing the following to the Department in a written request:

1) whether the discharge is from an outfall or point of discharge;

2) the outfall or point of discharge identification number assigned by the permittee;

3) the surface water of the state receiving the discharge from the outfall or point of discharge;

4) a map identifying the expanded regulated area served by the permittee's MS4;

5) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) includes BMPs to comply with the minimum requirements of the permit for the outfall or point of discharge and expanded regulated area; and

6) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) is being implemented in the expanded regulated area served by the outfall or point of discharge, including having available an up-to-date storm sewer system map as required in Part I.A.3.d.1) of this permit.

c. Upon review of the request to authorize the discharge from an outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit in accordance with Part I.A.2.a. or Part I.A.2.b. of this permit, the Department may determine that a permit modification is required, after opportunity for public comment. The Department will notify the permittee if a modification is required.

3. Storm Water Management Program (SWMP)

The permittee submitted a SWMP with its application for an NPDES permit. The SWMP is approved as submitted. The permittee shall implement the approved SWMP to comply with the minimum requirements identified in this permit. The SWMP shall cover the regulated area served by, or otherwise contributing to discharges from, the MS4 owned or operated by the permittee identified in the application. The permittee shall implement and enforce the SWMP to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the NREPA and the Federal Act. The approved SWMP is an enforceable part of this permit and any Department approved modifications made to the SWMP shall also become enforceable parts of this permit.

a. Enforcement Response Procedure (ERP)
The permittee shall implement the ERP for violations of the permittee's ordinances or regulatory mechanisms identified in the SWMP to the maximum extent practicable. The ERP shall be implemented to compel compliance with the permittee's ordinances and/or regulatory mechanisms and to deter continuing violations.

PART I

Section A. Limitations and Monitoring Requirements

The permittee shall track and document all enforcement conducted pursuant to the permittee's ERP. At a minimum, the permittee shall track and document the following: the name of the person responsible for violating the permittee's ordinance or regulatory mechanism; the date and location of the violation; a description of the violation; a description of the enforcement response used; a schedule for returning to compliance; and the date the violation was resolved.

b. Public Participation/Involvement Program (PPP)
The permittee shall implement the PPP to encourage public participation/involvement in the implementation and periodic review of the SWMP to the maximum extent practicable. The permittee shall implement the PPP as part of the SWMP. The permittee has chosen to work collaboratively with watershed or regional partners to implement the PPP or part of the PPP, therefore each permittee working collaboratively is responsible for complying with the PPP as described in the SWMP.

The PPP requires implementation of the following minimum requirements:

1) The procedure for making the SWMP available for public inspection and comment, including complying with local public notice requirements, as appropriate; and

2) The procedure for inviting public participation and involvement in the implementation and periodic review of the SWMP.

c. Public Education Program (PEP)
The permittee shall implement the PEP as part of the SWMP to the maximum extent practicable. At the minimum, the PEP shall promote, publicize, and facilitate education for the purpose of encouraging the public to reduce the discharge of pollutants in storm water runoff. The PEP shall be implemented to achieve measurable improvements in the public's understanding of storm water pollution and efforts to reduce the impacts of storm water pollution.

The PEP requires implementation of the following minimum requirements:

1) BMPs to address the following PEP topics:

(a) Promote public responsibility and stewardship in the permittee's watershed.

(b) Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges can have on surface waters of the state.

(c) Educate the public on illicit discharges and promote public reporting on illicit discharges and improper disposal of materials into the MS4.

(d) Promote preferred cleaning materials and procedures for car, pavement, and power washing.

(e) Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers.

(f) Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.

(g) Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous wastes, travel trailer sanitary wastes, chemicals, and motor vehicle fluids.

(h) Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure.

PART I

Section A. Limitations and Monitoring Requirements

(i) Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.

(j) Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to storm water runoff.

2) The procedure for determining the overall effectiveness of implementation and the process for modifying the PEP to address ineffective implementation. The Department may determine that a permit modification is required, after opportunity for public comment, based on modifications to the PEP. The Department will notify the permittee if a modification is required.

d. Illicit Discharge Elimination Program (IDEP)
The permittee shall implement and enforce the IDEP to detect and eliminate illicit discharges and connections to the permittee's MS4. The permittee shall implement the IDEP as part of the SWMP to the maximum extent practicable. The permittee has chosen to work collaboratively with watershed or regional partners to implement the IDEP or part of the IDEP, therefore each permittee working collaboratively is responsible for complying with the IDEP as described in the SWMP.

The IDEP requires implementation of the following minimum requirements:

1) An available, up-to-date storm sewer system map identifying the following: the storm sewer system, location of all outfalls and points of discharge the permittee owns or operates in the regulated area, and the names and location of all surface waters of the state that receive discharges from the permittee's MS4. The map shall be retained by the permittee and made available to the Department upon request. The map shall be maintained and updated as outfalls and points of discharge are identified, constructed, and installed in accordance with Part I.A.2. of this permit.

2) The plan to detect and eliminate non-storm water discharges to the permittee's MS4, including illegal dumping/spills. The plan includes the following:

a) A procedure for identifying priority areas for field observations. The permittee shall conduct field observations in accordance with the procedure identifying the priority area(s) developed as part of the IDEP.

b) A procedure for conducting field observations, field screening, and source investigations. The permittee shall conduct a field observation in accordance with the procedure during dry-weather at least once during the term of the permit. Field screening and source investigation shall be conducted in accordance with the schedule in the procedure.

Field observations, field screening, and source investigations shall include the following:

(1) Field Observation – The permittee shall observe the outfall or point of discharge for the following during dry-weather in accordance with the procedure: presence/absence of flow, water clarity, color, odor, floatable materials, deposits/stains on the discharge structure and bank, vegetation condition, structural condition, and biology (e.g. bacterial sheens, algae, and slimes).

(2) Field Screening – If flow is observed at an outfall or point of discharge, the permittee shall analyze the flow for the indicator parameters identified in the procedure. If the source of an illicit discharge is identified during the field observation, field screening may not be necessary.

PART I

Section A. Limitations and Monitoring Requirements

(3) Source Investigation – If the source of the illicit discharge was not identified by the field screening, the permittee shall conduct an investigation to identify the source in accordance with the procedure. If the permittee opts to use tracer dyes, the discharge of the dyes shall be authorized in accordance with Part I.A.6. of this permit.

If the permittee is made aware of non-storm water discharges outside the priority areas, illegal dumping/spills, or complaints received, the permittee shall conduct field observations and follow-up field screening and source investigations as appropriate in accordance with the procedure, including the schedule, in the IDEP. The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state in accordance with Part II.C.7. of this permit.

c) A procedure for responding to illicit discharges and pursuing enforcement action. The permittee shall implement the procedure to respond and pursue enforcement action once the source of the illicit discharge is identified, including the corrective action required to eliminate the illicit discharge. The permittee shall also implement the procedure to respond to illegal spills/dumping. For each illicit discharge not eliminated within 90 days of its discovery, the permittee shall provide, with the next progress report due, a written certification that the illicit discharge was eliminated or a description of how the illicit discharge will be eliminated.

3) The employee training program, which includes the following:

a) Training on techniques for identifying illicit discharges and connections, including field observations, field screening, and source investigations;

b) Training on procedures for reporting, responding to, and eliminating an illicit discharge or connection and the proper enforcement response; and

c) A schedule and requirement for training at least once during the term of the permit for existing staff and within the first year of hire for new staff.

4) The procedure for IDEP evaluation and determining the overall effectiveness of the IDEP.

e. Construction Storm Water Runoff Control Program

The permittee shall implement the construction storm water runoff control program to address areas of construction activity that disturb one (1) or more acres, including projects less than one (1) acre that are part of a larger common plan of development or sale. The permittee shall implement the construction storm water runoff control program as part of the SWMP to the maximum extent practicable.

The construction storm water runoff control program requires implementation of the following minimum requirements:

1) The procedure to notify the Part 91 Agency, or appropriate staff (if the permittee is a Part 91 Agency), when soil or sediment is discharged to the permittee's MS4 from a construction activity.

2) The procedure to notify the Department when soil, sediment, or other pollutants are discharged to the permittee's MS4 from a construction activity.

3) The procedure for ensuring that construction activity one (1) acre or greater in total earth disturbance with the potential to discharge to the permittee's MS4 obtains a Part 91 permit or is conducted by an approved Authorized Public Agency, as appropriate.

4) The procedure to advise the landowner or recorded easement holder of the State of Michigan Permit by Rule (R 323.2190 of the Part 21 Rules promulgated pursuant to Part 31 of the NREPA).

PART I

Section A. Limitations and Monitoring Requirements

f. Post-Construction Storm Water Runoff Program

The permittee shall implement and enforce the program to address post-construction storm water runoff from new development and redevelopment projects that disturb one (1) or more acres, including projects less than one (1) acre that are part of a larger common plan of development or sale, and that discharge into the permittee's MS4. The permittee shall implement and enforce the post-construction storm water control program as part of the SWMP, to the maximum extent practicable and in accordance with the approved ordinance or regulatory mechanism.

1) On or before March 1, 2021, the permittee shall submit to the Department for approval an in-effect Post-Construction Storm Water Control regulatory mechanism to achieve the post-construction storm water runoff performance standards set forth in a) and b) below at the project site (including projects where the permittee is the project developer). Upon Department approval of the in-effect regulatory mechanism, the permittee shall implement and enforce the regulatory mechanism requiring implementation of BMPs by the project developer (including the permittee if the permittee is the project developer) to achieve the post-construction storm water runoff performance standards at the project site to the maximum extent practicable.

a) Water Quality Control Performance Standard

Treat the post-development runoff volume generated from a 1.0-inch rainfall event. BMPs shall be designed on a site-specific basis to achieve a minimum of 80 percent removal of total suspended solids (TSS) as compared with uncontrolled runoff or a discharge concentration of TSS not to exceed 80 milligrams per liter (mg/l).

b) Channel Protection Control Performance Standard (CPC)

The CPC shall be implemented to limit the surface runoff rate and volume at the project site to maintain or restore stable hydrology in receiving waters. An alternative CPC was approved as part of the SWMP. The alternative CPC requires implementation of the following at the project site to the maximum extent practicable:

(1) Channel Protection Volume Control (CPVC): Retain onsite the post-development runoff volume from a 1.3-inch rainfall event, and

(2) Channel Protection Rate Control (CPRC): Provide extended detention for the post-development runoff volume from a 1.9-inch rainfall event.

On or before April 1, 2022 and on or before April 1 of each year following, as part of the approved alternative, the permittee shall submit an annual report to the Department for the previous calendar year documenting the results of implementing the alternative CPC within the regulated area. The annual report shall tabulate the following for each development or redevelopment project subject to the permittee's alternative CPC (including projects where the permittee is the project developer) and provide an overall summary for each reporting line:

(1) Change in impervious area, pervious area by cover type, and total area by site.

(2) CPVC volume provided at the site.

(3) Difference between required and provided CPVC volume by site.

(4) Percent of site in each Hydrologic Soil Group (Type A, B, C. D).

(5) Site location in geographic information system (GIS) polygon format.

(6) Site outfalls and points of discharge in GIS point format.

PART I

Section A. Limitations and Monitoring Requirements

(7) Site MS4 outfall drainage area in GIS polygon format, including any offsite drainage that passes through the outfall or points of discharge.

(8) CPRC volume provided at the site.

(9) Difference between required and provided CPRC volume by site.

The Department will provide a written determination to the permittee based on the review of each progress report. The permittee shall submit available documentation to support implementation of the alternative CPC, such as approved project plans, upon request. The permittee may submit information to support implementation of the alternative CPC in addition to the reporting requirements above as part of the progress report.

The alternative CPC approval is limited to the permit term. The results from the annual reports will be evaluated as part of permit reissuance using methods agreed to by the permittee and the Department, which may result in an updated alternative CPC. A modification to the alternative CPC during the permit term will result in a permit modification after opportunity for public comment.

2) The permittee shall implement and enforce the following site-specific requirements as part of meeting the post-construction storm water runoff performance standards set forth in a) and b), above:

a) The procedure for reviewing the use of infiltration BMPs to achieve the performance standards in areas of soil or groundwater contamination in a manner that does not exacerbate existing conditions.

b) The ordinance or regulatory mechanism requiring BMPs to address the associated pollutants in potential hot spots as part of meeting the performance standards. Hot spots include areas with the potential for significant pollutant loading including, but not limited to, the following: gas stations; vehicle maintenance and repair; auto recyclers; recycling centers and scrap yards; landfills; solid waste facilities; and railroads. Hot spots also include areas with the potential for contaminating public water supply intakes.

3) All structural and vegetative BMPs installed and implemented to meet the performance standards shall be operated and maintained in perpetuity by the BMP owner/operator. The permittee shall implement and enforce the ordinance or regulatory mechanism program to ensure long-term operation and maintenance of BMPs.

4) The ordinance or regulatory mechanism and procedures for site plan review and approval for projects that disturb one (1) or more acres, including projects less than one (1) acre that are part of a larger common plan of development or sale, and discharge to the permittee's MS4, including projects where the permittee is the developer. The site plan review and approval shall demonstrate compliance with the performance standards and long-term operation and maintenance requirements of this permit.

g. Pollution Prevention and Good Housekeeping Activities for Municipal Operations

The permittee shall implement the pollution prevention and good housekeeping program with the goal of preventing or reducing pollutant runoff from municipal facilities and operations that discharge storm water to surface waters of the state. The permittee shall implement the program as part of the SWMP to the maximum extent practicable.

PART I

Section A. Limitations and Monitoring Requirements

1) Municipal Facility and Structural Storm Water Control Inventory

The permittee shall make available to the Department upon request an up-to-date map or maps of the facilities and structural storm water controls owned or operated by the permittee with a discharge to surface waters of the state in the regulated area. In accordance with the procedure for updating and revising the permittee's facility inventory and map(s), the permittee shall submit to the Department the type and location for any new facility obtained or constructed during this permit term with a discharge of storm water to surface waters of the state and the information requested in Part I.A.2. of the permit.

2) Facility-Specific Storm Water Management

The permittee shall implement the facility-specific standard operating procedure (SOP) for each facility the permittee identified as having the high potential to discharge pollutants to surface waters of the state. The permittee shall implement the BMPs identified in the procedure to prevent or reduce pollutant runoff at each facility the permittee identified as having the medium or low potential to discharge pollutants to surface waters of the state. The permittee shall assess new facilities for the potential to discharge pollutants to surface waters of the state in accordance with the procedure to determine a priority level. High-priority facilities shall include permittee-owned or operated fleet maintenance and storage yards unless a demonstration is submitted and approved by the Department demonstrating how the permittee's fleet maintenance or storage yard has the low potential to discharge pollutants to surface waters of the state. The assessment shall be submitted in writing to the Department for approval within 30 days of ownership or operation of the new facility. The permittee shall certify in writing to the Department that a facility-specific SOP is being implemented within 90 days of ownership or operation of a new high-priority facility. Within 90 days of ownership or operation, the permittee shall certify in writing to the Department that BMPs are being implemented in accordance with the procedure developed to prevent or reduce pollutant runoff at each new medium- or low-priority facility. For new facilities, the Department may determine that a permit modification is required, after opportunity for public comment. The Department will notify the permittee if a modification is required. The permittee shall document all other changes to the facility assessment as part of the progress report and as an update to the procedure.

The facility-specific SOP shall be kept at the site described in the SOP and made available upon request by the Department. The facility-specific SOP for each high-priority facility shall include implementation of the following.

a) Structural and non-structural storm water controls to prevent or reduce the discharge of pollutants to surface waters of the state.

b) Up-to-date list of significant materials stored on-site that could pollute storm water with a description of the handling and storage requirements and potential to discharge for each significant material.

c) Good housekeeping practices including, but not limited to, maintaining a clean and orderly facility, properly storing and covering materials, and minimizing pollutant sources to prevent or reduce pollutant runoff.

d) Routine maintenance and inspections of storm water management and control devices to ensure materials and equipment are clean and orderly and prevent or reduce pollutant runoff. The written report of the inspection and corrective actions shall be retained in accordance with Part II.B.5. of this permit.

e) Comprehensive site inspections at least once every six (6) months. The comprehensive site inspection shall include an inspection of all structural storm water controls and a review of non-structural storm water controls to prevent or reduce pollutant runoff. A written report of the inspection and corrective actions shall be retained in accordance with Part II.B.5. of this permit.

PART I

Section A. Limitations and Monitoring Requirements

3) Structural Storm Water Control Operation and Maintenance Activities

a) The permittee shall implement the procedures for inspecting, cleaning, and maintaining permittee-owned or operated catch basins in the regulated area using the priority level assigned to each catch basin. The permittee shall document changes to the priority level for a catch basin as part of the progress report and as an update to the procedure.

The permittee shall also implement the procedure for dewatering and disposal of materials extracted from the catch basins in accordance with Part 111 (Hazardous Waste), Part 115 (Solid Waste), and Part 121 (Liquid Industrial Waste) of the NREPA.

b) The permittee shall implement the procedure for inspecting and maintaining permittee-owned or operated structural storm water controls other than catch basins in the regulated area. The permittee shall document changes to the procedure as part of the progress report and as an update to the procedure.

c) The permittee shall implement the procedure requiring that new permittee-owned or operated facilities or structural storm water controls to address water quantity be designed and implemented in accordance with the post-construction storm water runoff performance standards and long-term operation and maintenance requirements in Part I.A.3.f. of this permit.

4) Municipal Operations and Maintenance Activities

a) The permittee shall implement the procedure, including the BMPs identified, to prevent or reduce pollutant runoff from the permittee's operation and maintenance activities identified in the SWMP. The permittee shall document changes to the assessment of operation and maintenance activities for the potential to discharge pollutants to surface waters of the state as part of the progress report and as an update to the procedure.

b) The permittee shall implement the procedure for the street sweeping program for permittee-owned or operated streets, parking lots, or other impervious infrastructure in the regulated area using the sweeping methods and assigned priority levels identified in the procedure. The permittee shall document changes to the priority level for a street, parking lot, or other impervious infrastructure as part of the progress report and as an update to the procedure.

The permittee shall also implement the procedure for dewatering and disposal of street sweeper waste material.

5) Managing Vegetated Properties

The permittee shall implement the procedure requiring the permittee's pesticide applicator to be certified by the State of Michigan as an applicator in the applicable category, to prevent or reduce pollutant runoff from vegetated land.

6) Employee Training

The permittee shall implement the employee training program to train employees involved in implementing pollution prevention and good housekeeping activities. At a minimum, existing staff shall be trained once during the permit cycle and new hire employees within the first year of their hire date.

7) Contractor Requirements and Oversight

The permittee shall implement the procedure requiring contractors hired by the permittee to perform municipal operation and maintenance activities that comply with the permittee's pollution prevention and good housekeeping program and contractor oversight to ensure compliance.

PART I

Section A. Limitations and Monitoring Requirements

h. Total Maximum Daily Load (TMDL) Implementation Plan
The permittee shall implement the TMDL Implementation Plan to reduce the discharge of pollutants from the permittee's MS4 to make progress in meeting Water Quality Standards. The permittee shall implement the TMDL Implementation Plan as part of the SWMP.

The following TMDLs are applicable to the discharge from the permittee's MS4:

Name of TMDL	Pollutant of Concern
Clinton River	*E.coli*
Red Run Drain and Bear Creek	*E.coli*
Rouge River	Biota (sediment) and *E.coli*
Johnson Creek	Dissolved oxygen
Kent Lake	Phosphorus
Norton Creek	Dissolved oxygen
Strawberry Lake	Phosphorus

The permittee shall implement the prioritized BMPs included in the TMDL Implementation Plan during the permit cycle to make progress in achieving the pollutant load reduction requirement in the TMDL. The permittee shall review, update, and revise the list of BMPs implemented as part of the TMDL Implementation Plan in accordance with the procedure included in the SWMP. The Department may determine that a permit modification is required, after opportunity for public comment, based on modifications to the TMDL Implementation Plan. The Department will notify the permittee if a modification is required.

The permittee shall implement the monitoring plan included in the TMDL Implementation Plan for assessing the effectiveness of the BMPs implemented in making progress toward achieving the TMDL pollutant load reduction. Available monitoring data shall be submitted with each progress report.

4. SWMP Modifications

a. SWMP Modifications Requested by the Permittee
Modifications to the previously approved SWMP may be requested by the permittee as follows:

1) Modifications adding BMPs (but not replacing, subtracting, or affecting the level of implementation of any other BMP) to the previously approved SWMP may be made by the permittee at any time upon written notification to the Department. Notification shall include a description of the modification, which may include a description of a new BMP with a corresponding measurable goal. Upon notification to the Department, the modification is considered an enforceable part of the approved SWMP.

2) Modifications replacing an ineffective or unfeasible BMP identified in the previously approved SWMP with an alternative BMP may be requested at any time by written notification to the Department. The ineffective or unfeasible BMP identified shall not be replaced in the previously approved SWMP unless the replacement is approved by the Department. Modifications to the previously approved SWMP may result in a permit modification after opportunity for public comment. Such requests shall include the following:

a) an analysis of why the BMP is ineffective or unfeasible (including cost-prohibitive);

b) a measurable goal for the replacement BMP; and

c) an analysis of why the replacement BMP is expected to achieve the intent of the BMP to be replaced.

PART I

Section A. Limitations and Monitoring Requirements

3) Modifications subtracting an ineffective or unfeasible BMP identified in the previously approved SWMP may be requested by written notification to the Department. The identified BMP shall not be subtracted from the previously approved SWMP unless the subtraction is approved by the Department. Modifications to the previously approved SWMP may result in a permit modification after opportunity for public comment. Such requests shall include the following:

a) an analysis of why the BMP is ineffective or unfeasible (including cost prohibitive); and

b) a determination of why the removal of the BMP will not change the permittee's ability to comply with the permit requirements.

b. Modifications Required by the Department
The Department may require the permittee to modify the SWMP as needed to:

1) address contributions from the permittee's MS4 discharge that impair receiving water quality;

2) include more stringent requirements necessary to comply with new state or federal statutory or regulatory requirements; and/or

3) include such other conditions deemed necessary by the Department to comply with the goals and requirements of the Federal Act or the NREPA, including the requirement to reduce the discharge of pollutants from the MS4 to the maximum extent practicable.

5. Request for Approval to Use Water Treatment Additives

This permit does not authorize the use of any water treatment additive without prior written approval from the Department. Such approval is authorized under separate correspondence. Water treatment additives include any materials that are added to water used at the facility, or to wastewater generated by the facility, to condition or treat the water. Permittees proposing to use water treatment additives, including a proposed increased concentration of a previously approved water treatment additive, shall submit a request for approval via the Department's MiWaters system. The MiWaters website is located at https://miwaters.deq.state.mi.us. Instructions for submitting such a request may be obtained at http://www.michigan.gov/npdes (near the bottom of that page, click on one or both of the links located under the Water Treatment Additives banner). Additional monitoring and reporting may be required as a condition of approval to use the water treatment additive.

A request for approval to use water treatment additives shall include all of the following usage and discharge information for each water treatment additive proposed to be used:

a. The Safety Data Sheet (SDS);

b. Ingredient information, including the name of each ingredient, CAS number for each ingredient, and fractional content by weight for each ingredient;

c. The proposed water treatment additive discharge concentration with supporting calculations;

d. The discharge frequency (i.e., number of hours per day and number of days per year);

e. The outfall(s) and monitoring point(s) from which the water treatment additive is to be discharged;

f. The type of removal treatment, if any, that the water treatment additive receives prior to discharge;

g. The water treatment additive's function (i.e., microbiocide, flocculant, etc.);

h. The SDS shall include a 48-hour LC50 or EC50 for a North American freshwater planktonic crustacean (either *Ceriodaphnia* sp., *Daphnia* sp., or *Simocephalus* sp.); The results shall be based on the whole water treatment additive, shall not be results based on a similar product, and shall not be estimated; and

PART I

Section A. Limitations and Monitoring Requirements

i. The SDS shall include the results of a toxicity test for one (1) other North American freshwater aquatic species (other than a planktonic crustacean) that meets a minimum requirement of R 323.1057(2) of the Water Quality Standards. The results shall be based on the whole water treatment additive, shall not be results based on a similar product, and shall not be estimated. Examples of tests that would meet this requirement include a 96-hour LC50 for rainbow trout, bluegill, or fathead minnow.

6. Tracer Dye Discharges

This permit does not authorize the discharge of tracer dyes without approval from the Department. Requests to discharge tracer dyes shall be submitted to the Department in accordance with Rule 1097 (R 323.1097 of the Michigan Administrative Code).

7. Storm Water Program Manager (Facility Contact)

The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address and telephone number of the new facility contact).

a. The facility contact shall be (or a duly authorized representative of this person):
- for a corporation, a principal executive officer of at least the level of vice president; or a designated representative if the representative is responsible for the overall operation of the facility from which the discharge originates, as described in the permit application or other NPDES form,
- for a partnership, a general partner,
- for a sole proprietorship, the proprietor, or
- for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

b. A person is a duly authorized representative only if:
- the authorization is made in writing to the Department by a person described in paragraph a. of this section; and
- the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).

Nothing in this section obviates the permittee from properly submitting reports and forms as required by law.

PART I

Section B. Program Assessment and Reporting

1. Progress Reports

Progress reports shall be submitted on or before April 1, 2022 and on or before April 1 every two (2) years following. The Department may approve alternate dates for progress report submittal if requested and adequately justified by the permittee. Each progress report shall contain the following information for the entire period that has elapsed since the last progress report submittal (i.e., the reporting cycle):

a. Compliance Assessment
The permittee shall describe the status of compliance with the approved SWMP identified in Part I.A.3 of this permit. The permittee shall assess and describe the appropriateness of the BMPs identified in the SWMP. The report shall describe the progress made towards achieving the identified measurable goals for each of the BMPs, and specific evaluation criteria as follows:

1) For the PEP, provide a summary of the evaluation of the overall effectiveness of the PEP, using the evaluation methods described in the PEP.

2) For the IDEP, provide a summary of the evaluation and determination of the overall effectiveness of the IDEP, using the evaluation methods described in the IDEP. For each illicit discharge that was not eliminated within 90 days of its discovery the permittee shall provide a written certification that the illicit discharge was eliminated or a description of how the illicit discharge will be eliminated.

3) If applicable, the permittee shall submit to the Department any new outfall or point of discharge information as required in Part I.A.2. of this permit.

4) For the TMDL Implementation Plan, if monitoring data is available in accordance with the monitoring plan, provide an assessment of progress made toward achieving the TMDL pollutant load reduction requirement.

b. Data and Results
The permittee shall provide a summary of all of the information collected and analyzed, including monitoring data, if any, during the reporting cycle.

c. Upcoming Activities
The permittee shall provide a summary of the BMPs to be implemented during the next reporting cycle.

d. Changes to BMPs and Measurable Goals
The permittee shall describe any changes to BMPs or measurable goals in the approved SWMP. In accordance with the permit, these changes will be reviewed to determine if a permit modification is necessary. The Department will notify the permittee if a permit modification is required.

e. Notice of Changes in Nested Jurisdiction Agreements
The permittee shall identify any nested jurisdictions that enter into or terminate permit agreements with the permittee which were not identified in the SWMP. The permittee may request to modify the permit coverage to add or remove a nested MS4 by submitting a request to the Department for approval in accordance with Part I.A.1.b. of this permit. Modifications to the permit coverage may result in a permit modification, after opportunity for public comment.

f. Required Signatures
All reports required by this permit, and other information requested by the Department, shall be signed by either a principal executive officer or ranking elected official, or by a duly authorized representative of that person in accordance with 40 CFR 122.22(b).

PART II

Part II may include terms and /or conditions not applicable to discharges covered under this permit.

Section A. Definitions

Acute toxic unit (TU_A) means $100/LC_{50}$ where the LC_{50} is determined from a whole effluent toxicity (WET) test which produces a result that is statistically or graphically estimated to be lethal to 50% of the test organisms.

Annual monitoring frequency refers to a calendar year beginning on January 1 and ending on December 31. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Authorized public agency means a state, local, or county agency that is designated pursuant to the provisions of Section 9110 of Part 91, Soil and Sedimentation Control, of the NREPA, to implement soil erosion and sedimentation control requirements with regard to construction activities undertaken by that agency.

Best management practices (BMPs) means structural devices or nonstructural practices that are designed to prevent pollutants from entering into storm water, to direct the flow of storm water, or to treat polluted storm water.

Bioaccumulative chemical of concern (BCC) means a chemical which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor of more than 1000 after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation. The human health bioaccumulation factor shall be derived according to R 323.1057(5). Chemicals with half-lives of less than 8 weeks in the water column, sediment, and biota are not BCCs. The minimum bioaccumulation concentration factor (BAF) information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the biota-sediment accumulation factor (BSAF) methodology. The minimum BAF information needed to define an inorganic chemical as a BCC, including an organometal, is either a field-measured BAF or a laboratory-measured bioconcentration factor (BCF). The BCCs to which these rules apply are identified in Table 5 of R 323.1057 of the Water Quality Standards.

Biosolids are the solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. This includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

Bulk biosolids means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

Certificate of Coverage (COC) is a document, issued by the Department, which authorizes a discharge under a general permit.

Chronic toxic unit (TU_C) means 100/MATC or $100/IC_{25}$, where the maximum acceptable toxicant concentration (MATC) and IC_{25} are expressed as a percent effluent in the test medium.

Class B biosolids refers to material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with the Part 24 Rules, Land Application of Biosolids, promulgated under Part 31 of the NREPA. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Combined sewer system is a sewer system in which storm water runoff is combined with sanitary wastes.

Continuous monitoring refers to sampling/readings that occur at regular and consistent intervals throughout a 24-hour period and at a frequency sufficient to capture data that are representative of the discharge. The maximum acceptable interval between samples/readings shall be one (1) hour.

PART II

Section A. Definitions

Daily concentration
FOR PARAMETERS OTHER THAN pH, DISSOLVED OXYGEN, TEMPERATURE, AND CONDUCTIVITY – Daily concentration is the sum of the concentrations of the individual samples of a parameter taken within a calendar day divided by the number of samples taken within that calendar day. The daily concentration will be used to determine compliance with any maximum and minimum daily concentration limitations. For guidance and examples showing how to perform calculations using results below quantification levels, see the document entitled "Reporting Results Below Quantification," available at https://www.michigan.gov/documents/deq/wrd-npdes-results-quantification_620791_7.pdf.

FOR pH, DISSOLVED OXYGEN, TEMPERATURE, AND CONDUCTIVITY – The daily concentration used to determine compliance with maximum daily pH, temperature, and conductivity limitations is the highest pH, temperature, and conductivity readings obtained within a calendar day. The daily concentration used to determine compliance with minimum daily pH and dissolved oxygen limitations is the lowest pH and dissolved oxygen readings obtained within a calendar day.

Daily loading is the total discharge by weight of a parameter discharged during any calendar day. This value is calculated by multiplying the daily concentration by the total daily flow and by the appropriate conversion factor. The daily loading will be used to determine compliance with any maximum daily loading limitations. When required by the permit, report the maximum calculated daily loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs.

Daily monitoring frequency refers to a 24-hour day. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Department means the Michigan Department of Environment, Great Lakes, and Energy.

Detection level means the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.

Discharge means the addition of any waste, waste effluent, wastewater, pollutant, or any combination thereof to any surface water of the state.

EC_{50} means a statistically or graphically estimated concentration that is expected to cause 1 or more specified effects in 50% of a group of organisms under specified conditions.

Fecal coliform bacteria monthly
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a discharge event. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR. If the period in which the discharge event occurred was partially in each of two months, the calculated monthly value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a reporting month. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

PART II

Section A. Definitions

Fecal coliform bacteria 7-day
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days of discharge during a discharge event. If the number of daily concentrations determined during the discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean value for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. If the 7-day period was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days in a reporting month. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. The first calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

Flow-proportioned composite sample – See definition of **24-hour composite sample**.

General permit means an NPDES permit authorizing a category of similar discharges.

Geometric mean is the average of the logarithmic values of a base 10 data set, converted back to a base 10 number.

Grab sample is a single sample taken at neither a set time nor flow.

IC_{25} means the toxicant concentration that would cause a 25% reduction in a nonquantal biological measurement for the test population.

Illicit connection means a physical connection to a municipal separate storm sewer system that primarily conveys non-storm water discharges other than uncontaminated groundwater into the storm sewer; or a physical connection not authorized or permitted by the local authority, where a local authority requires authorization or a permit for physical connections.

Illicit discharge means any discharge to, or seepage into, a municipal separate storm sewer system that is not composed entirely of storm water or uncontaminated groundwater. Illicit discharges include non-storm water discharges through pipes or other physical connections; dumping of motor vehicle fluids, household hazardous wastes, domestic animal wastes, or litter; collection and intentional dumping of grass clippings or leaf litter; or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-storm water waste directly into a separate storm sewer.

Individual permit means a site-specific NPDES permit.

Inlet means a catch basin, roof drain, conduit, drain tile, retention pond riser pipe, sump pump, or other point where storm water or wastewater enters into a closed conveyance system prior to discharge off site or into waters of the state.

PART II

Section A. Definitions

Interference is a discharge which, alone or in conjunction with a discharge or discharges from other sources, both: 1) inhibits or disrupts a POTW, its treatment processes or operations, or its sludge processes, use or disposal; and 2) therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or, of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act. [This definition does not apply to sample matrix interference].

Land application means spraying or spreading biosolids or a biosolids derivative onto the land surface, injecting below the land surface, or incorporating into the soil so that the biosolids or biosolids derivative can either condition the soil or fertilize crops or vegetation grown in the soil.

LC_{50} means a statistically or graphically estimated concentration that is expected to be lethal to 50% of a group of organisms under specified conditions.

Maximum acceptable toxicant concentration (MATC) means the concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration that did not cause the occurrence of a specific adverse effect. An upper chronic limit is the lowest tested concentration which did cause the occurrence of a specific adverse effect and above which all tested concentrations caused such an occurrence.

Maximum extent practicable means implementation of best management practices by a public body to comply with an approved storm water management program as required by a national permit for a municipal separate storm sewer system, in a manner that is environmentally beneficial, technically feasible, and within the public body's legal authority.

MBTU/hr means million British Thermal Units per hour.

MGD means million gallons per day.

Monthly concentration is the sum of the daily concentrations determined during a reporting period divided by the number of daily concentrations determined. The calculated monthly concentration will be used to determine compliance with any maximum monthly concentration limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly concentration in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

For minimum percent removal requirements, the monthly influent concentration and the monthly effluent concentration shall be determined. The calculated monthly percent removal, which is equal to 100 times the quantity [1 minus the quantity (monthly effluent concentration divided by the monthly influent concentration)], shall be reported in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Monthly loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined during a reporting period. The calculated monthly loading will be used to determine compliance with any maximum monthly loading limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly loading in the "AVERAGE" column under "QUANTITY OR LOADING" on the DMR.

Monthly monitoring frequency refers to a calendar month. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Municipal separate storm sewer means a conveyance or system of conveyances designed or used for collecting or conveying storm water which is not a combined sewer and which is not part of a POTW as defined in the Code of Federal Regulations at 40 CFR 122.2.

PART II

Section A. Definitions

Municipal separate storm sewer system (MS4) means all separate storm sewers that are owned or operated by the United States, a state, city, village, township, county, district, association, or other public body created by or pursuant to state law, having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law, such as a sewer district, flood control district, or drainage district, or similar entity, or a designated or approved management agency under Section 208 of the Clean Water Act that discharges to the waters of the state. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

National Pretreatment Standards are the regulations promulgated by or to be promulgated by the Federal Environmental Protection Agency pursuant to Section 307(b) and (c) of the Clean Water Act. The standards establish nationwide limits for specific industrial categories for discharge to a POTW.

No observed adverse effect level (NOAEL) means the highest tested dose or concentration of a substance which results in no observed adverse effect in exposed test organisms where higher doses or concentrations result in an adverse effect.

Noncontact cooling water is water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product or finished product.

Nondomestic user is any discharger to a POTW that discharges wastes other than or in addition to water-carried wastes from toilet, kitchen, laundry, bathing or other facilities used for household purposes.

Nonstructural controls are practices or procedures implemented by employees at a facility to manage storm water or to prevent contamination of storm water.

NPDES means National Pollutant Discharge Elimination System.

Outfall is the location at which a point source discharge first enters a surface water of the state.

Part 91 agency means an agency that is designated by a county board of commissioners pursuant to the provisions of Section 9105 of Part 91 of the NREPA; an agency that is designated by a city, village, or township in accordance with the provisions of Section 9106 of Part 91 of the NREPA; or the Department for soil erosion and sedimentation control activities under Part 615, Supervisor of Wells; Part 631, Reclamation of Mining Lands; or Part 632, Nonferrous Metallic Mineral Mining, of the NREPA, pursuant to the provisions of Section 9115 of Part 91 of the NREPA.

Part 91 permit means a soil erosion and sedimentation control permit issued by a Part 91 agency pursuant to the provisions of Part 91 of the NREPA.

Partially treated sewage is any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is treated to a level less than that required by the permittee's NPDES permit, or that is not treated to national secondary treatment standards for wastewater, including discharges to surface waters from retention treatment facilities.

Point of discharge is the location of a point source discharge where storm water is discharged directly into a separate storm sewer system.

Point source discharge means a discharge from any discernible, confined, discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock. Changing the surface of land or establishing grading patterns on land will result in a point source discharge where the runoff from the site is ultimately discharged to waters of the state.

PART II

Section A. Definitions

Polluting material means any material, in solid or liquid form, identified as a polluting material under the Part 5 Rules, Spillage of Oil and Polluting Materials, promulgated under Part 31 of the NREPA (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

POTW is a publicly owned treatment work.

Predevelopment is the last land use prior to the planned new development or redevelopment.

Pretreatment is reducing the amount of pollutants, eliminating pollutants, or altering the nature of pollutant properties to a less harmful state prior to discharge into a public sewer. The reduction or alteration can be by physical, chemical, or biological processes, process changes, or by other means. Dilution is not considered pretreatment unless expressly authorized by an applicable National Pretreatment Standard for a particular industrial category.

Public (as used in the MS4 individual permit) means all persons who potentially could affect the authorized storm water discharges, including, but not limited to, residents, visitors to the area, public employees, businesses, industries, and construction contractors and developers.

Public body means the United States; the state of Michigan; a city, village, township, county, school district, public college or university, or single-purpose governmental agency; or any other body which is created by federal or state statute or law.

Qualified Personnel means an individual who meets qualifications acceptable to the Department and who is authorized by an Industrial Storm Water Certified Operator to collect the storm water sample.

Qualifying storm event means a storm event causing greater than 0.1 inch of rainfall and occurring at least 72 hours after the previous measurable storm event that also caused greater than 0.1 inch of rainfall. Upon request, the Department may approve an alternate definition meeting the condition of a qualifying storm event.

Quantification level means the measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calculated at a specified concentration above the detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

Quarterly monitoring frequency refers to a three month period, defined as January through March, April through June, July through September, and October through December. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Regional Administrator is the Region 5 Administrator, U.S. EPA, located at R-19J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

Regulated area means the permittee's urbanized area, where urbanized area is defined as a place and its adjacent densely-populated territory that together have a minimum population of 50,000 people as defined by the United States Bureau of the Census and as determined by the latest available decennial census.

Secondary containment structure means a unit, other than the primary container, in which significant materials are packaged or held, which is required by state or federal law to prevent the escape of significant materials by gravity into sewers, drains, or otherwise directly or indirectly into any sewer system or to the surface waters or groundwaters of the state.

Separate storm sewer system means a system of drainage, including, but not limited to, roads, catch basins, curbs, gutters, parking lots, ditches, conduits, pumping devices, or man-made channels, which is not a combined sewer where storm water mixes with sanitary wastes, and is not part of a POTW.

PART II

Section A. Definitions

Significant industrial user is a nondomestic user that: 1) is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or 2) discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process waste stream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the permittee as defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's treatment plant operation or violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Significant materials means any material which could degrade or impair water quality, including but not limited to: raw materials; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; hazardous substances designated under Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (see 40 CFR 372.65); any chemical the facility is required to report pursuant to Section 313 of Emergency Planning and Community Right-to-Know Act (EPCRA); polluting materials as identified under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code); Hazardous Wastes as defined in Part 111, Hazardous Waste Management, of the NREPA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills and significant leaks means any release of a polluting material reportable under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

Special-use area means storm water discharges for which the Department has determined that additional monitoring is needed from: secondary containment structures required by state or federal law; lands on Michigan's List of Sites of Environmental Contamination pursuant to Part 201, Environmental Remediation, of the NREPA; and/or areas with other activities that may contribute pollutants to the storm water.

Stoichiometric means the quantity of a reagent calculated to be necessary and sufficient for a given chemical reaction.

Storm water means storm water runoff, snow melt runoff, surface runoff and drainage, and non-storm water included under the conditions of this permit.

Storm water discharge point is the location where the point source discharge of storm water is directed to surface waters of the state or to a separate storm sewer. It includes the location of all point source discharges where storm water exits the facility, including *outfalls* which discharge directly to surface waters of the state, and *points of discharge* which discharge directly into separate storm sewer systems.

Structural controls are physical features or structures used at a facility to manage or treat storm water.

SWPPP means the Storm Water Pollution Prevention Plan prepared in accordance with this permit.

Tier I value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier I toxicity database.

Tier II value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier II toxicity database.

Total maximum daily loads (TMDLs) are required by the Clean Water Act for waterbodies that do not meet water quality standards. TMDLs represent the maximum daily load of a pollutant that a waterbody can assimilate and meet water quality standards, and an allocation of that load among point sources, nonpoint sources, and a margin of safety.

Toxicity reduction evaluation (TRE) means a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

PART II

Section A. Definitions

Water Quality Standards means the Part 4 Water Quality Standards promulgated pursuant to Part 31 of the NREPA, being R 323.1041 through R 323.1117 of the Michigan Administrative Code.

Weekly monitoring frequency refers to a calendar week which begins on Sunday and ends on Saturday. For a calendar week that falls entirely within a single calendar month, then when required by this permit, an analytical result, reading, value, or observation shall be reported for that week if a discharge occurs during that week. For a calendar week split across two (2) calendar months, a separate analytical result, reading, value, or observation shall be reported for each part of that week/month in which a discharge occurs.

WWSL is a wastewater stabilization lagoon.

WWSL discharge event is a discrete occurrence during which effluent is discharged to the surface water up to 10 days of a consecutive 14 day period.

3-portion composite sample is a sample consisting of three equal-volume grab samples collected at equal intervals over an 8-hour period.

7-day concentration
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily concentrations determined. If the number of daily concentrations determined during the WWSL discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations. When required by the permit, report the maximum calculated 7-day concentration for the WWSL discharge event in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days in a reporting month divided by the number of daily concentrations determined. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations in the reporting month. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

PART II

Section A. Definitions

7-day loading
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily loadings determined. If the number of daily loadings determined during the WWSL discharge event is less than 7 days, the number of actual daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations. When required by the permit, report the maximum calculated 7-day loading for the WWSL discharge event in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days in a reporting month divided by the number of daily loadings determined. If the number of daily loadings determined is less than 7, the actual number of daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations in the reporting month. When required by the permit, report the maximum calculated 7-day loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

24-hour composite sample is a flow-proportioned composite sample consisting of hourly or more frequent portions that are taken over a 24-hour period and in which the volume of each portion is proportional to the discharge flow rate at the time that portion is taken. A time-proportioned composite sample may be used upon approval from the Department if the permittee demonstrates it is representative of the discharge.

PART II

Section B. Monitoring Procedures

1. Representative Samples

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations promulgated pursuant to Section 304(h) of the Clean Water Act (40 CFR Part 136 – Guidelines Establishing Test Procedures for the Analysis of Pollutants), unless specified otherwise in this permit. **Test procedures used shall be sufficiently sensitive to determine compliance with applicable effluent limitations**. Requests to use test procedures not promulgated under 40 CFR Part 136 for pollutant monitoring required by this permit shall be made in accordance with the Alternate Test Procedures regulations specified in 40 CFR 136.4. These requests shall be submitted to the Manager of the Permits Section, Water Resources Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30458, Lansing, Michigan, 48909-7958. The permittee may use such procedures upon approval.

The permittee shall periodically calibrate and perform maintenance procedures on all analytical instrumentation at intervals to ensure accuracy of measurements. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Assurance/Quality Control program.

3. Instrumentation

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring instrumentation at intervals to ensure accuracy of measurements.

4. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: 1) the exact place, date, and time of measurement or sampling; 2) the person(s) who performed the measurement or sample collection; 3) the dates the analyses were performed; 4) the person(s) who performed the analyses; 5) the analytical techniques or methods used; 6) the date of and person responsible for equipment calibration; and 7) the results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Department.

PART II

Section C. Reporting Requirements

1. Start-Up Notification

If the permittee will not discharge during the first 60 days following the effective date of this permit, the permittee shall notify the Department within 14 days following the effective date of this permit, and then 60 days prior to the commencement of the discharge.

2. Submittal Requirements for Self-Monitoring Data

Part 31 of the NREPA (specifically Section 324.3110(7)); and R 323.2155(2) of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, allow the Department to specify the forms to be utilized for reporting the required self-monitoring data. Unless instructed on the effluent limitations page to conduct "Retained Self-Monitoring," the permittee shall submit self-monitoring data via the Department's MiWaters system.

The permittee shall utilize the information provided on the MiWaters website, located at https://miwaters.deq.state.mi.us, to access and submit the electronic forms. Both monthly summary and daily data shall be submitted to the Department no later than the 20th day of the month following each month of the authorized discharge period(s). The permittee may be allowed to submit the electronic forms after this date if the Department has granted an extension to the submittal date.

3. Retained Self-Monitoring Requirements

If instructed on the effluent limits page (or otherwise authorized by the Department in accordance with the provisions of this permit) to conduct retained self-monitoring, the permittee shall maintain a year-to-date log of retained self-monitoring results and, upon request, provide such log for inspection to the staff of the Department. Retained self-monitoring results are public information and shall be promptly provided to the public upon request.

The permittee shall certify, in writing, to the Department, on or before January 10th (April 1st for animal feeding operation facilities) of each year, that: 1) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained; and 2) the application on which this permit is based still accurately describes the discharge. With this annual certification, the permittee shall submit a summary of the previous year's monitoring data. The summary shall include maximum values for samples to be reported as daily maximums and/or monthly maximums and minimum values for any daily minimum samples.

Retained self-monitoring may be denied to a permittee by notification in writing from the Department. In such cases, the permittee shall submit self-monitoring data in accordance with Part II.C.2., above. Such a denial may be rescinded by the Department upon written notification to the permittee. Reissuance or modification of this permit or reissuance or modification of an individual permittee's authorization to discharge shall not affect previous approval or denial for retained self-monitoring unless the Department provides notification in writing to the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

Monitoring required pursuant to Part 41 of the NREPA or Rule 35 of the Mobile Home Park Commission Act, 1987 PA 96, as amended, for assurance of proper facility operation, shall be submitted as required by the Department.

PART II

Section C. Reporting Requirements

5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittee shall submit a *written* notification to the Department indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

6. Noncompliance Notification

Compliance with all applicable requirements set forth in the Clean Water Act, Parts 31 and 41 of the NREPA, and related regulations and rules is required. All instances of noncompliance shall be reported as follows:

a. 24-Hour Reporting
Any noncompliance which may endanger health or the environment (including maximum and/or minimum daily concentration discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days.

b. Other Reporting
The permittee shall report, in writing, all other instances of noncompliance not described in a. above at the time monitoring reports are submitted; or, in the case of retained self-monitoring, within five (5) days from the time the permittee becomes aware of the noncompliance.

Written reporting shall include: 1) a description of the discharge and cause of noncompliance; and 2) the period of noncompliance, including exact dates and times, or, if not yet corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

7. Spill Notification

The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittee has determined that the release is not in excess of the threshold reporting quantities specified in the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code), by calling the Department at the number indicated on the second page of this permit (or, if this is a general permit, on the COC); or, if the notice is provided after regular working hours, call the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706 (calls from **out-of-state** call 1-517-373-7660).

Within ten (10) days of the release, the permittee shall submit to the Department a full written explanation as to the cause of the release, the discovery of the release, response (clean-up and/or recovery) measures taken, and preventive measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

PART II

Section C. Reporting Requirements

8. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset shall notify the Department by telephone within 24 hours of becoming aware of such conditions; and within five (5) days, provide in writing, the following information:

a. that an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. that the permitted wastewater treatment facility was, at the time, being properly operated and maintained (note that an upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation); and

c. that the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

In any enforcement proceedings, the permittee, seeking to establish the occurrence of an upset, has the burden of proof.

9. Bypass Prohibition and Notification

a. Bypass Prohibition
Bypass is prohibited, and the Department may take an enforcement action, unless:

1) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2) there were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass; and

3) the permittee submitted notices as required under 9.b. or 9.c. below.

b. Notice of Anticipated Bypass
If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least ten (10) days before the date of the bypass, and provide information about the anticipated bypass as required by the Department. The Department may approve an anticipated bypass, after considering its adverse effects, if it will meet the three (3) conditions listed in 9.a. above.

c. Notice of Unanticipated Bypass
The permittee shall submit notice to the Department of an unanticipated bypass by calling the Department at the number indicated on the second page of this permit (if the notice is provided after regular working hours, call: 1-800-292-4706) as soon as possible, but no later than 24 hours from the time the permittee becomes aware of the circumstances.

PART II

Section C. Reporting Requirements

d. Written Report of Bypass
A written submission shall be provided within five (5) working days of commencing any bypass to the Department, and at additional times as directed by the Department. The written submission shall contain a description of the bypass and its cause; the period of bypass, including exact dates and times, and if the bypass has not been corrected, the anticipated time it is expected to continue; steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass; and other information as required by the Department.

e. Bypass Not Exceeding Limitations
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to ensure efficient operation. These bypasses are not subject to the provisions of 9.a., 9.b., 9.c., and 9.d., above. This provision does not relieve the permittee of any notification responsibilities under Part II.C.11. of this permit.

f. Definitions

1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

10. Bioaccumulative Chemicals of Concern (BCC)

Consistent with the requirements of R 323.1098 and R 323.1215 of the Michigan Administrative Code, the permittee is prohibited from undertaking any action that would result in a lowering of water quality from an increased loading of a BCC unless an increased use request and antidegradation demonstration have been submitted and approved by the Department.

11. Notification of Changes in Discharge

The permittee shall notify the Department, in writing, as soon as possible but no later than 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of: 1) detectable levels of chemicals on the current Michigan Critical Materials Register, priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, or the Pollutants of Initial Focus in the Great Lakes Water Quality Initiative specified in 40 CFR 132.6, Table 6, which were not acknowledged in the application or listed in the application at less than detectable levels; 2) detectable levels of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information; or 3) any chemical at levels greater than five times the average level reported in the complete application (see the first page of this permit, for the date(s) the complete application was submitted). Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the compliance schedules.

PART II

Section C. Reporting Requirements

12. Changes in Facility Operations

Any anticipated action or activity, including but not limited to facility expansion, production increases, or process modification, which will result in new or increased loadings of pollutants to the receiving waters must be reported to the Department by a) submission of an increased use request (application) and all information required under R 323.1098 (Antidegradation) of the Water Quality Standards or b) by notice if the following conditions are met: 1) the action or activity will not result in a change in the types of wastewater discharged or result in a greater quantity of wastewater than currently authorized by this permit; 2) the action or activity will not result in violations of the effluent limitations specified in this permit; 3) the action or activity is not prohibited by the requirements of Part II.C.10.; and 4) the action or activity will not require notification pursuant to Part II.C.11. Following such notice, the permit or, if applicable, the facility's COC may be modified according to applicable laws and rules to specify and limit any pollutant not previously limited.

13. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall submit to the Department 30 days prior to the actual transfer of ownership or control a written agreement between the current permittee and the new permittee containing: 1) the legal name and address of the new owner; 2) a specific date for the effective transfer of permit responsibility, coverage and liability; and 3) a certification of the continuity of or any changes in operations, wastewater discharge, or wastewater treatment.

If the new permittee is proposing changes in operations, wastewater discharge, or wastewater treatment, the Department may propose modification of this permit in accordance with applicable laws and rules.

14. Operations and Maintenance Manual

For wastewater treatment facilities that serve the public (and are thus subject to Part 41 of the NREPA), Section 4104 of Part 41 and associated Rule 2957 of the Michigan Administrative Code allow the Department to require an Operations and Maintenance (O&M) Manual from the facility. An up-to-date copy of the O&M Manual shall be kept at the facility and shall be provided to the Department upon request. The Department may review the O&M Manual in whole or in part at its discretion and require modifications to it if portions are determined to be inadequate.

At a minimum, the O&M Manual shall include the following information: permit standards; descriptions and operation information for all equipment; staffing information; laboratory requirements; record keeping requirements; a maintenance plan for equipment; an emergency operating plan; safety program information; and copies of all pertinent forms, as-built plans, and manufacturer's manuals.

Certification of the existence and accuracy of the O&M Manual shall be submitted to the Department at least sixty days prior to start-up of a new wastewater treatment facility. Recertification shall be submitted sixty days prior to start-up of any substantial improvements or modifications made to an existing wastewater treatment facility.

PART II

Section C. Reporting Requirements

15. Signatory Requirements

All applications, reports, or information submitted to the Department in accordance with the conditions of this permit and that require a signature shall be signed and certified as described in the Clean Water Act and the NREPA.

The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

The NREPA (Section 3115(2)) provides that a person who at the time of the violation knew or should have known that he or she discharged a substance contrary to this part, or contrary to a permit, COC, or order issued or rule promulgated under this part, or who intentionally makes a false statement, representation, or certification in an application for or form pertaining to a permit or COC or in a notice or report required by the terms and conditions of an issued permit or COC, or who intentionally renders inaccurate a monitoring device or record required to be maintained by the Department, is guilty of a felony and shall be fined not less than $2,500.00 or more than $25,000.00 for each violation. The court may impose an additional fine of not more than $25,000.00 for each day during which the unlawful discharge occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than $25,000.00 per day and not more than $50,000.00 per day of violation. Upon conviction, in addition to a fine, the court in its discretion may sentence the defendant to imprisonment for not more than 2 years or impose probation upon a person for a violation of this part. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction. However, the person shall not be subject to the penalties of this subsection if the discharge of the effluent is in conformance with and obedient to a rule, order, permit, or COC of the Department. In addition to a fine, the attorney general may file a civil suit in a court of competent jurisdiction to recover the full value of the injuries done to the natural resources of the state and the costs of surveillance and enforcement by the state resulting from the violation.

16. Electronic Reporting

Upon notice by the Department that electronic reporting tools are available for specific reports or notifications, the permittee shall submit electronically all such reports or notifications as required by this permit, on forms provided by the Department.

PART II

Section D. Management Responsibilities

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit, more frequently than, or at a level in excess of, that authorized, shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of the NREPA and/or the Clean Water Act and constitutes grounds for enforcement action; for permit or Certificate of Coverage (COC) termination, revocation and reissuance, or modification; or denial of an application for permit or COC renewal.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility certification by the Department, as required by Sections 3110 and 4104 of the NREPA. Permittees authorized to discharge storm water shall have the storm water treatment and/or control measures under direct supervision of a storm water operator certified by the Department, as required by Section 3110 of the NREPA.

3. Facilities Operation

The permittee shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

4. Power Failures

In order to maintain compliance with the effluent limitations of this permit and prevent unauthorized discharges, the permittee shall either:

a. provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit; or

b. upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to the surface waters or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

PART II

Section D. Management Responsibilities

6. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of polluting materials in accordance with the requirements of the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code). For a POTW, these facilities shall be approved under Part 41 of the NREPA.

7. Waste Treatment Residues

Residuals (i.e. solids, sludges, biosolids, filter backwash, scrubber water, ash, grit, or other pollutants or wastes) removed from or resulting from treatment or control of wastewaters, including those that are generated during treatment or left over after treatment or control has ceased, shall be disposed of in an environmentally compatible manner and according to applicable laws and rules. These laws may include, but are not limited to, the NREPA, Part 31 for protection of water resources, Part 55 for air pollution control, Part 111 for hazardous waste management, Part 115 for solid waste management, Part 121 for liquid industrial wastes, Part 301 for protection of inland lakes and streams, and Part 303 for wetlands protection. Such disposal shall not result in any unlawful pollution of the air, surface waters or groundwaters of the state.

8. Right of Entry

The permittee shall allow the Department, any agent appointed by the Department, or the Regional Administrator, upon the presentation of credentials and, for animal feeding operation facilities, following appropriate biosecurity protocols:

a. to enter upon the permittee's premises where an effluent source is located or any place in which records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect process facilities, treatment works, monitoring methods and equipment regulated or required under this permit; and to sample any discharge of pollutants.

9. Availability of Reports

Except for data determined to be confidential under Section 308 of the Clean Water Act and Rule 2128 (R 323.2128 of the Michigan Administrative Code), all reports prepared in accordance with the terms of this permit, shall be available for public inspection at the offices of the Department and the Regional Administrator. As required by the Clean Water Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Clean Water Act and Sections 3112, 3115, 4106 and 4110 of the NREPA.

10. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or the facility's COC, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

PART II

Section E. Activities Not Authorized by This Permit

1. Discharge to the Groundwaters

This permit does not authorize any discharge to the groundwaters. Such discharge may be authorized by a groundwater discharge permit issued pursuant to the NREPA.

2. POTW Construction

This permit does not authorize or approve the construction or modification of any physical structures or facilities at a POTW. Approval for the construction or modification of any physical structures or facilities at a POTW shall be by permit issued under Part 41 of the NREPA.

3. Civil and Criminal Liability

Except as provided in permit conditions on "Bypass" (Part II.C.9. pursuant to 40 CFR 122.41(m)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond the permittee's control, such as accidents, equipment breakdowns, or labor disputes.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Clean Water Act except as are exempted by federal regulations.

5. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environment, Great Lakes, and Energy permits, or approvals from other units of government as may be required by law.

Appendix J — Augusta Drain Dropfall Structural Report

Description of Structure:

Structure Assessed:	Augusta Drain, Drop Fall Chamber and Junction Chamber
Year Built:	1972
Foundation:	Reinforced, Cast-in-Place Concrete
Floor Structure:	Reinforced, Cast-in-Place Concrete
Wall Structure:	Drop Chamber – Carbon Steel Sheet Pile Junction Chamber - Reinforced, Cast-in-Place Concrete
Roof Structure:	Junction Chamber - Reinforced, Cast-in-Place Concrete
Measurements:	N/A

General:

As requested, by the Oakland County Water Resources Commissioner, Hubbell, Roth & Clark (HRC) performed an onsite structural assessment of the Augusta Drain Drop Fall Chamber and Junction Chamber on September 11, 2018. The Augusta Drain is in Pontiac, MI, within Sections 19, 20, 29, and 30 of the Pontiac Township Drain Index Map. The Augusta Drain Drop Fall Chamber and Junction Chamber are located approximately 250 feet northwest of 404 Lake Laura Drive in Pontiac, MI.

As-Built Drawings prepared by Jones & Henry Engineers, dated 1969, were made available to HRC prior to inspection. Plans and details provided in Drawings No. 49B and 51 were used to establish a base line of the Augusta Drain Drop Fall Chamber and Junction Chamber's as-built condition. Please see Figure 1 through Figure 4 for reference. Please note that boxed leader/call-outs in **RED** are HRC's comments to more easily identify structural elements discussed within this report.

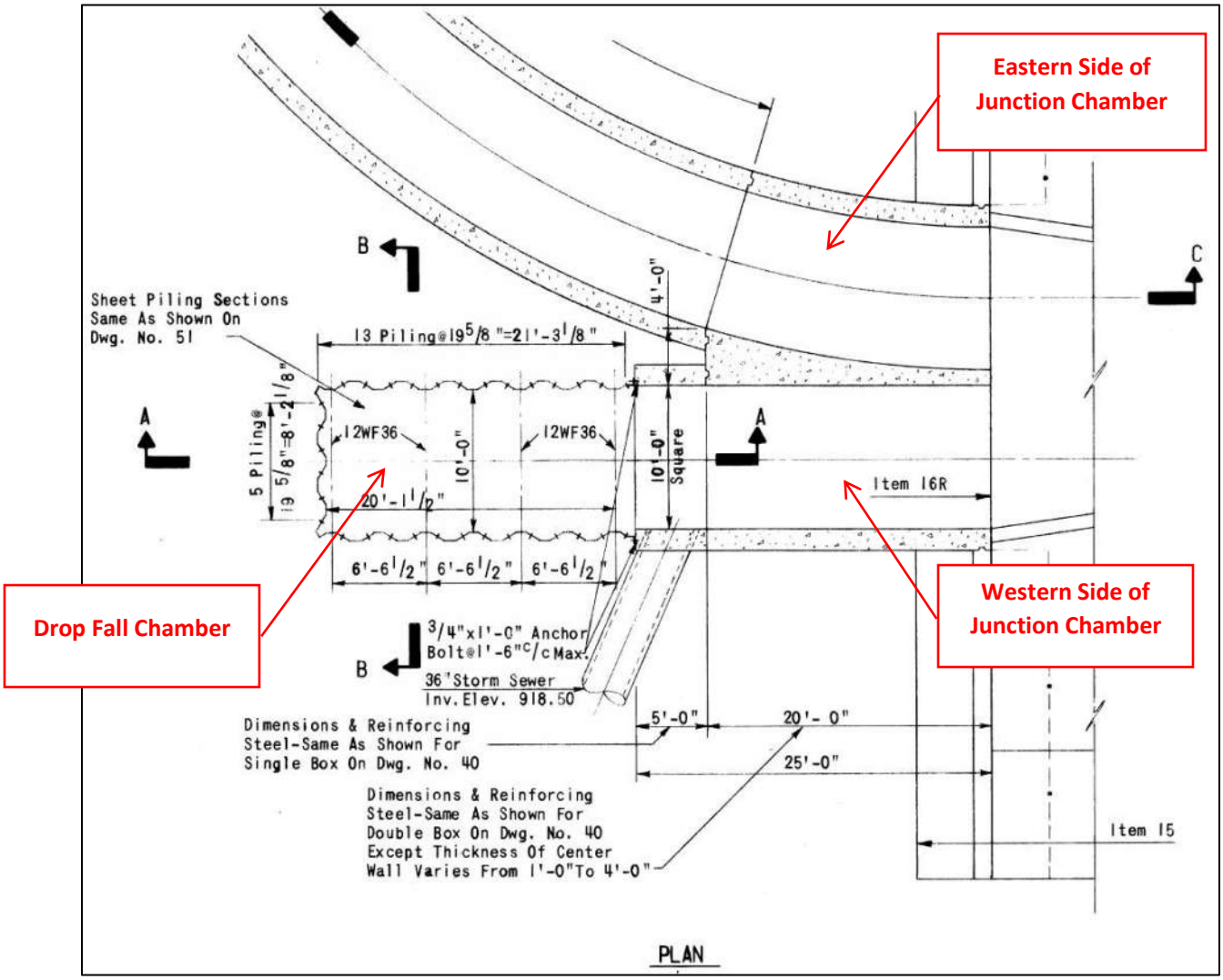


Figure 1: Plan (DWG 49B)

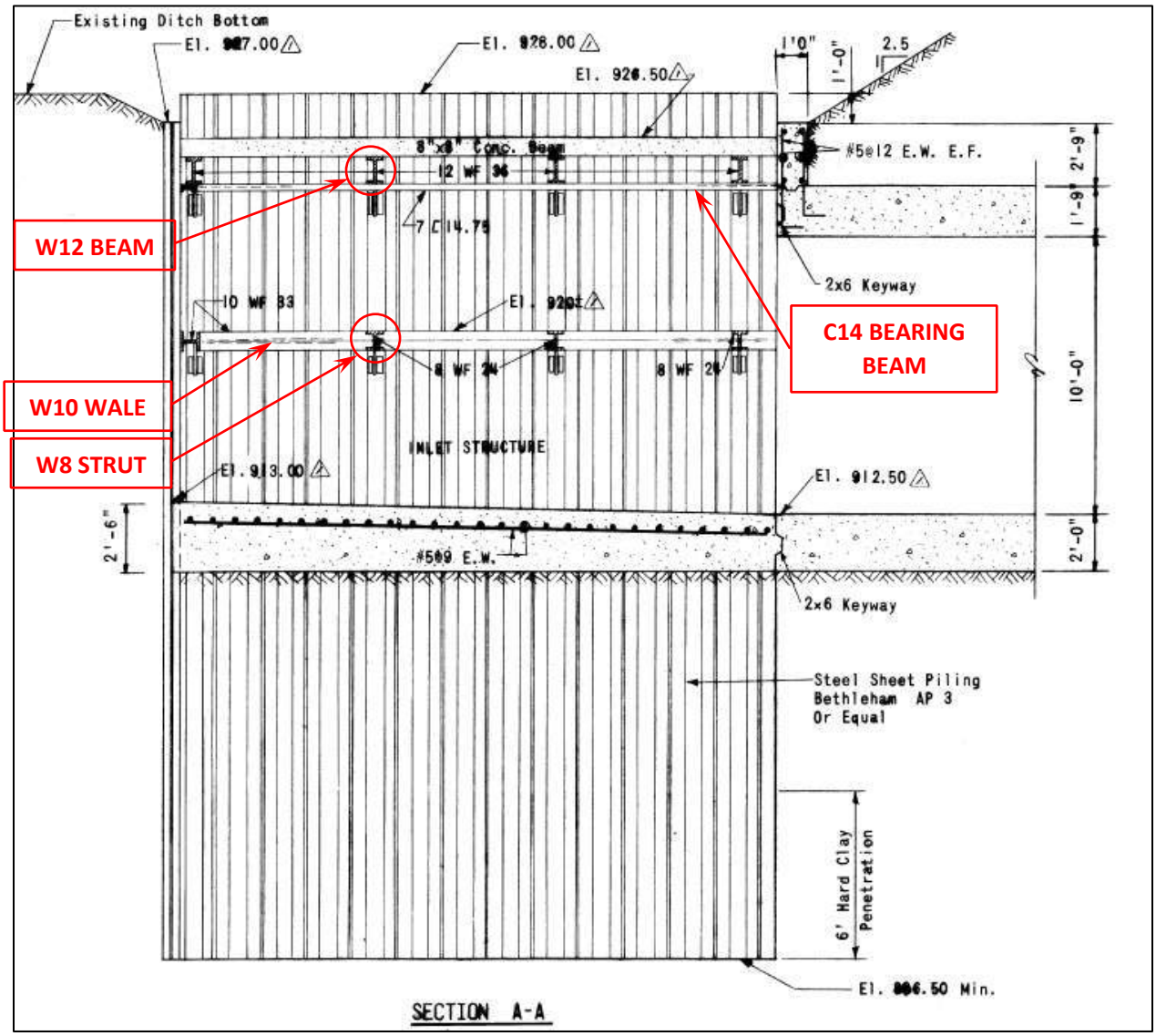


Figure 2: Section A-A (DWG 51)

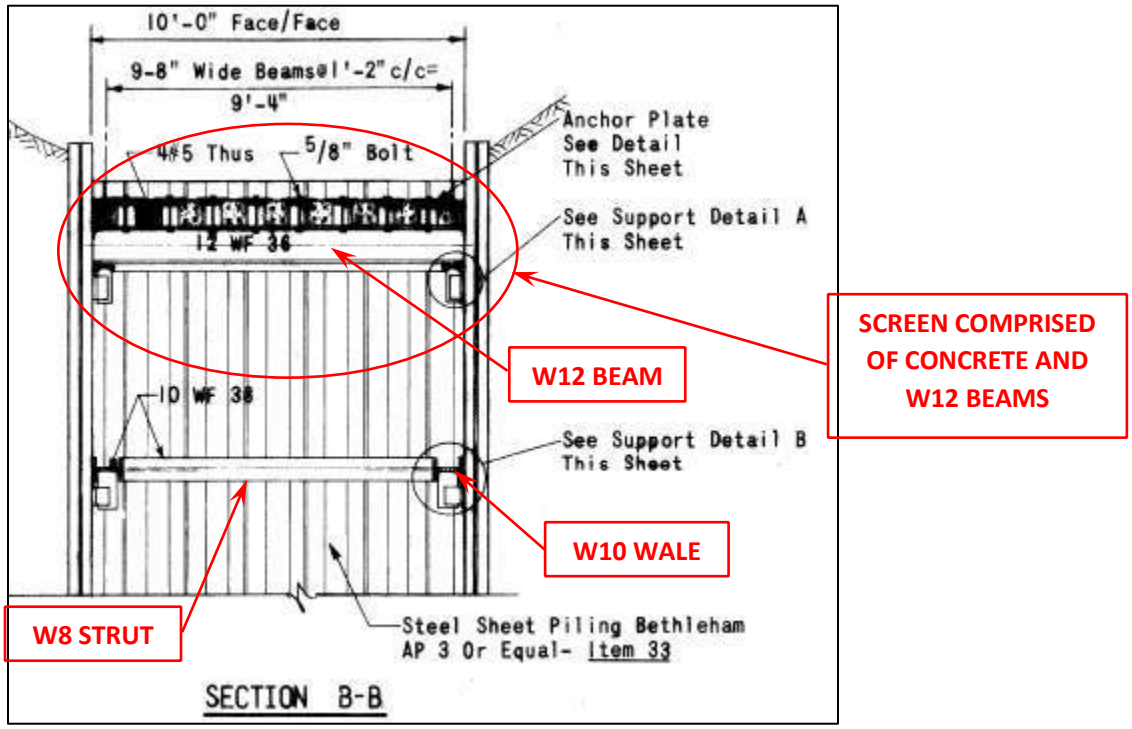


Figure 3: Section B-B (DWG 51)

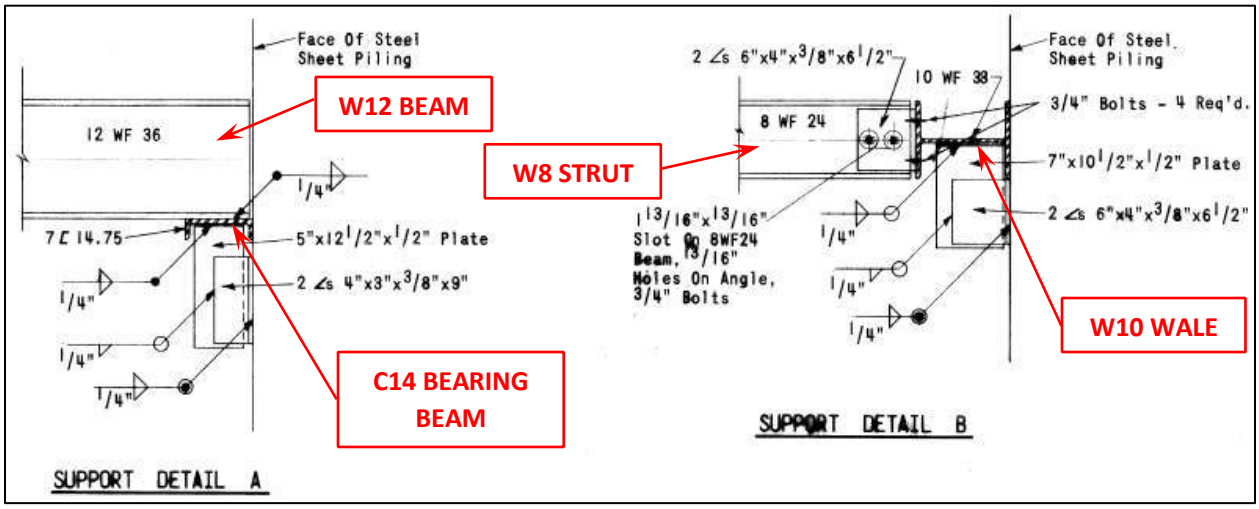


Figure 4: Support Details (DWG 51)

Observations:

Drop Fall Chamber:

The drop fall structure was in a state of failure. The screen comprised of 8”x8” concrete beams and W12 steel beams which has vertically dropped approximately five feet and is now temporarily supported on the adjacent sheet pile walls and underlying W8 Struts. Measurements of the sheet piles walls indicate that the walls have laterally deflected in the center. HRC was also able to observe that some of the underlying struts have significantly deteriorated, containing through-hole corrosion and have buckled.

The sheet piling appears to be in fair condition with a moderate amount of corrosion visible on the internal surface. There did not appear to be any through-holes or separations in the sheet pile wall seams. Due to limited access into the Drop Fall Chamber, sheet piling wall thickness readings could not be obtained. The sheet pile wall does appear to have laterally deflected inward approximately 13-inches at the center. The lateral deflection of the sheet piles is visible and measurable from the top of the Drop Fall Chamber. As-Built drawings show that the minimum clear distance between sheet piling should be 10’-0”. Measurements taken from approximately 6-inches below the top of sheet piling ranged from 8’-11” to 10’-0”. Please refer to Figure 8 for measurements and locations and Picture 1 through Picture 3.

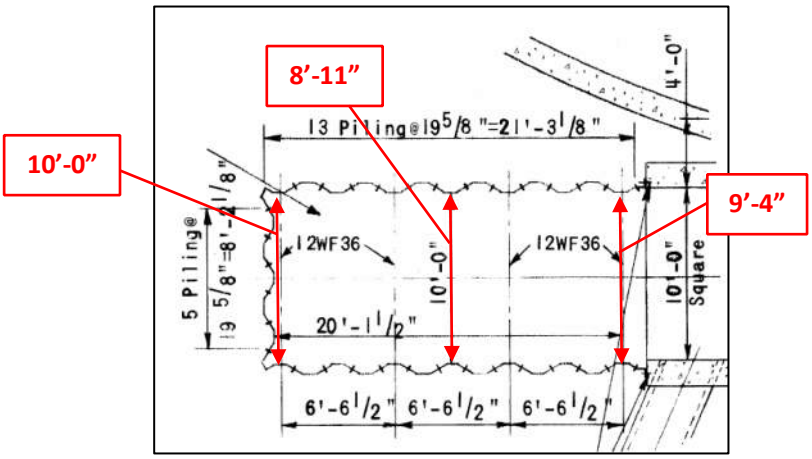


Figure 5: Drop Fall Chamber Field Measurements

The screen comprised of concrete and W12 beams has vertically dropped and is temporarily supported on the adjacent sheet pile walls and the underlying W8 Struts. Please refer to Pictures 5 through Picture 8. The screens’ support clips and C14 Bearing Beam that connected the screen to the sheet pile wall are no longer in place. Please refer to , Support Detail A (Figure 4) for As-Built Drawing of the W12 Beam’s connection detail and Pictures 3 and Picture 8.

Through-hole corrosion in the underlying W8 Strut's web was noted in the two W8 Struts located near the center of the Chamber and the North-of-center W8 Strut appears to have buckled. W8 Strut nearest to the Junction Chamber opening does not appear to be connected to the east sheet pile wall as detailed in Support Detail B of Figure 4, instead it is cantilevering from the western connection, additionally it has rotated approximately 90-degrees about its longitudinal axis as detailed in Figure 2: Section A-A. Condition of the W10 Wales could not be ascertained due to poor visibility and limited accessibility. Please refer to Figure 6 for assessment diagram of remaining W8 Struts and Picture 7 through Picture 9.

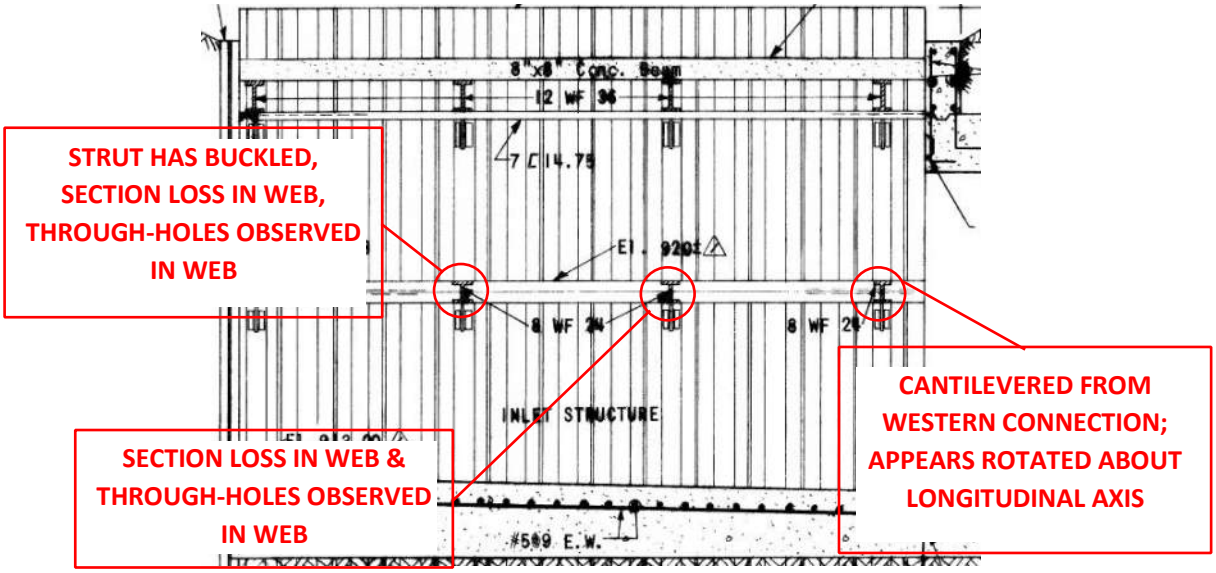


Figure 6: Strut Observation Summary

Junction Chamber:

HRC also inspected the concrete Junction Chamber directly adjacent to the Drop Fall Chamber. The Junction Chamber consist of an eastern side and western side (Figure 1). Several cracks, spalls and leaks were noted in the chamber's concrete walls, top slab and retaining walls.

The interior of the western portion of the Junction Chamber appears to be in good condition with spalls noted near the low-flow water line. Water flowing around the sheet wall has created a "waterfall" over the head wall of the western portion of the chamber. Section loss was noted at each side of the chamber's influent opening where water has been eroding away the concrete paste. Please refer to Picture 10, 11 and 13.

The interior of the eastern portion of the Junction Chamber appears to be in good condition with spalls noted near the low-flow water line. Leaks and rust stains were noted within the Junction Chamber. Please refer to the Junction Chamber Observation Summary diagram (Figure 7) and Picture 12.

The reinforced, cast-in-place concrete retaining walls appear to be in fair condition with open joints and large spalls noted through the overgrowth vegetation. Cracking and spalling were noted along the western joint, between the western retaining wall and the junction chamber, exposing some reinforcing steel. Cracking and spalling were noted along the eastern joint, between the eastern retaining wall and the junction chamber. Please refer to Pictures 14 through 17.

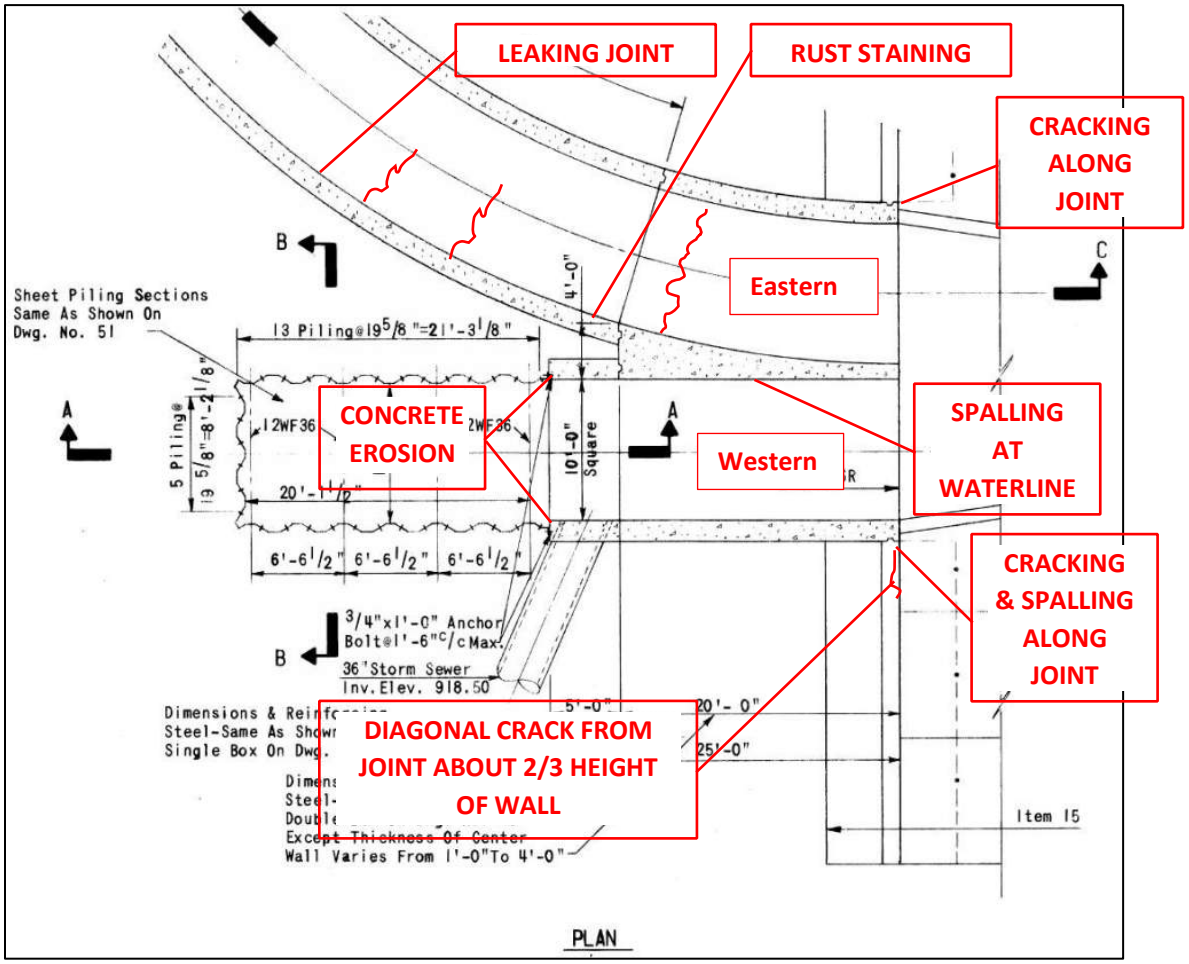
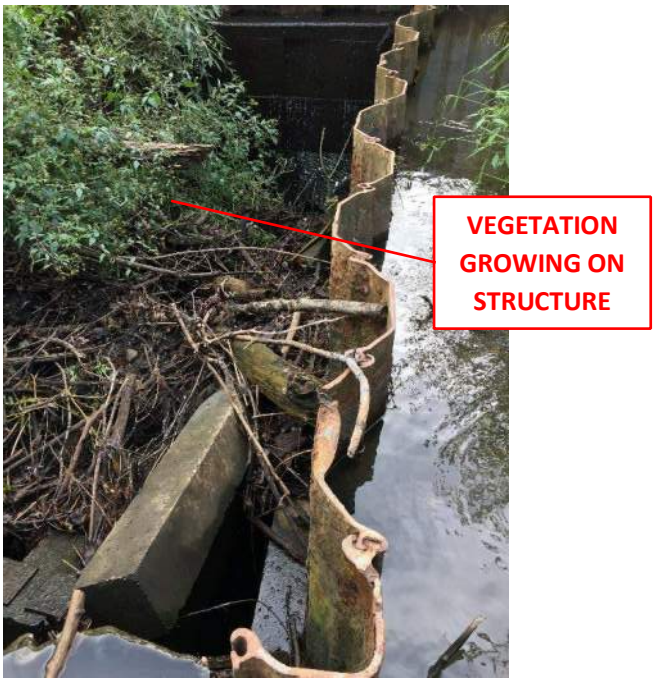


Figure 7: Junction Chamber Observation Summary

Photo Documentation:



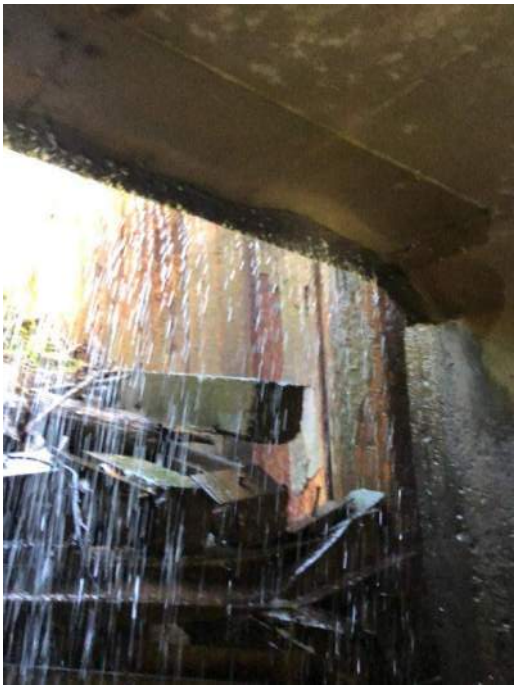
Picture 1: Top of Drop Fall Chamber

Picture 2: Water Flowing Around Sheet Piling

Picture 4: Remaining Screen Support Clip

Picture 3: Sheet Pile Corrosion

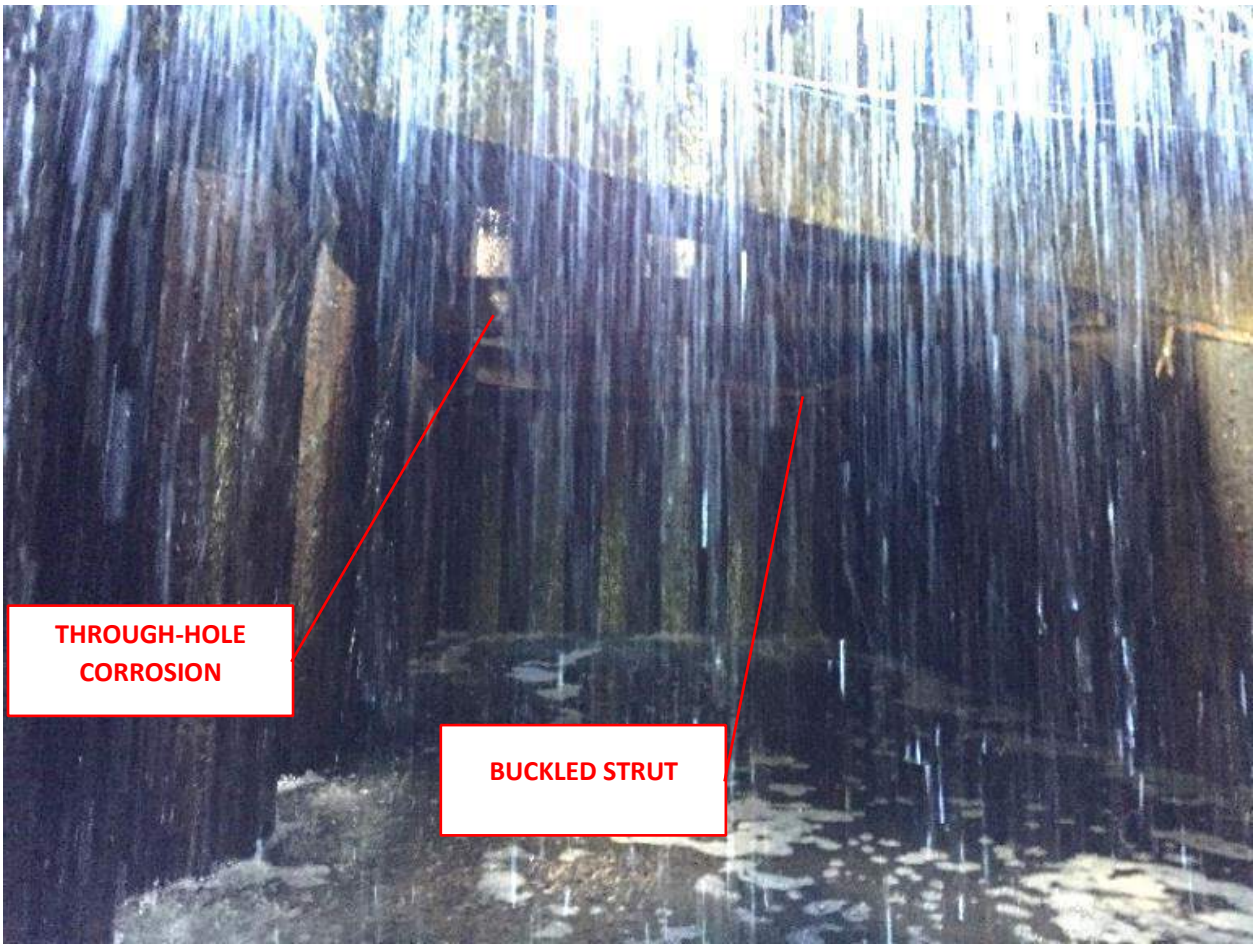
Picture 5: Collapsed Drop Fall Structure as Viewed from Within Junction Chamber



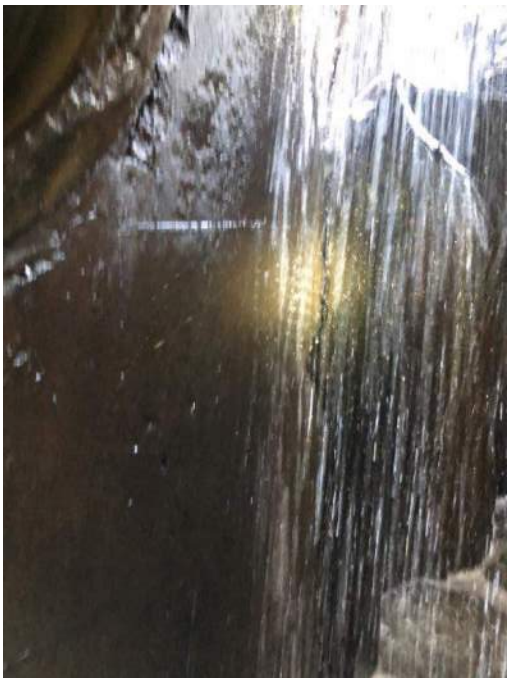
Picture 6: Concrete Beams

Picture 7: Drop Fall Remaining Struts

Picture 8: Screen and Strut Structure



Picture 9: Remaining Strut Condition



Picture 10: Junction Chamber Concrete Erosion - Western Corner

Picture 12: Junction Chamber Concrete Erosion - Eastern Corner

Picture 13: Staining Within Junction Chamber; East Chamber

Picture 11: Spall Within Junction Chamber; West Chamber

Picture 15: Joint Between Western Retaining Wall and Junction Chamber

Picture 14: Width of Joint Opening at Top

Picture 16: Width of Spall

Picture 17: Width of Joint Opening at Bottom

Recommendations:

Repair: ***Drop Fall Chamber:***

The concrete and W12 Beams, W8 Struts, and connections are all in various states of failure. HRC recommends the immediate rehabilitation and/or replacement of the Drop Fall Chamber. Possible options are as follows:

- *Option A: Replacement with Precast Concrete Screen Vault*
  - *Demolish and remove the existing screen structure, the underlying strut structure, and the sheet pile walls.*
  - *Place new Precast Screen Vault within sheet pile walls*
    - *Vault should be designed per the current code requirements.*
    - *Vault roof shall be perforated as to permit water to pass. Openings in the roof should be similar in size to the existing screen as prescribed in the original As-Built drawings.*
    - *Vault should be anchored into the Junction Chamber Opening.*
  - *Back fill around the vault.*
  - *Engineer's Preliminary Opinion of Probable Construction Cost:* ***$149,000***
    - *This cost estimate is for construction costs, mobilization and contingencies only. Estimate does not include design fees or project management fees.*
    - *Estimate is based on 2018 dollars.*

- *Option B: Rehabilitation of Drop Fall Chamber*
  - *Demolish and remove the existing screen structure.*
  - *Install temporary shoring designed by a licensed Professional Engineer.*
  - *Demolish and remove the W8 Struts and W10 Wales.*
  - *Inspect sheet pile walls and assess condition for rehabilitation and reuse.*
  - *Rehabilitate or replace sheet pile wall as prescribed.*
  - *Install new wales and struts.*
  - *Install new screen.*
  - *Engineer's Preliminary Opinion of Probable Construction Cost:* ***$102,000***
    - *This cost estimate is for construction costs, mobilization and contingencies only. Estimate does not include design fees or project management fees.*
    - *Estimate is based on 2018 dollars.*

Economic life cycle costs for each option should be developed and become a part of the replacement or rehabilitation decision process.

Junction Chamber:

HRC recommends rehabilitation of the Junction Chamber to extend its service life. Observed cracks in the retaining walls should be repaired using a structural pressure injected epoxy. Observed spalls and leaks within the east and west Junction Chamber should be patched and repaired with a cementitious repair material.

Overall Condition

Overall Condition of the Drop Chamber: ***Condition Level 3***

Overall Condition of the Junction Chamber: ***Condition Level 2***

Condition Levels:

Condition Level 1 = No Immediate Action Required

Condition Level 2 = Recommended Rehabilitation to Extend Service Life

Condition Level 3 = Immediate Rehabilitation and/or Replacement Recommended

Limitations/Exclusions of Observations

Hubbell, Roth & Clark's scope of work for the Augusta Drain Drop Structure included inspection of the visible portions of both Drain Fall Chamber and Junction Chamber Structures. Waterflow was relatively low on the day of the inspection but the structural inspection was limited to the areas that could be safely accessed. The deteriorated condition of the remaining Drain Fall Chamber's screen made it hazardous to enter the Drain Fall Structure. Observations and comments contained herein are based on what could be safely observed from the top side of the Drain Fall Chamber and from the influent opening of the Junction Chamber. Inspection of the base slab was limited due to sediment buildup as well as water flow. Inspection of the retaining walls was limited due to the vegetative overgrowth.

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